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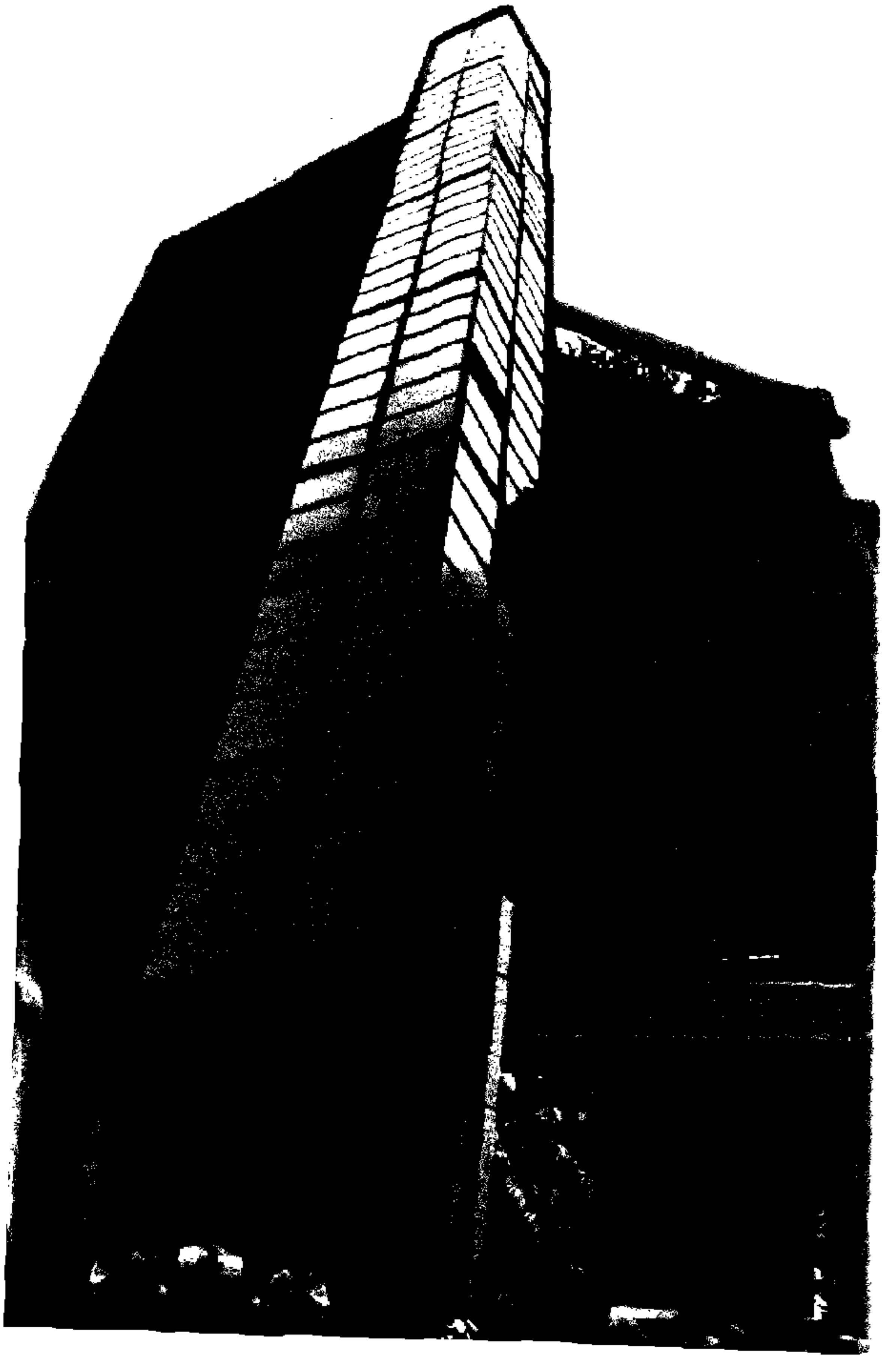

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Dated : 12th Jan. 2004

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Towards Developing a National Bibliographical Database in Science and Technology in India

Sujit Bhattacharya and BM Gupta

(National Institute of Science, Technology and Development Studies, Dr K S Krishnan Marg, New Delhi-110012. sujit@nistads.res.in; bmgupta@nistads.res.in)

Science is at crossroads in India. On one hand there is intense discussion of the need to leverage our strengths from the research work done in the country so that we can progress towards a 'knowledge based economy' where creating, sharing and using knowledge are key factors in the prosperity and well being of its people. On the otherhand declining interest in science has led academicians and policy makers expressing concern in our future capability to face the challenges and derive benefits from knowledge-based activities.

Quantitative studies based on S&T statistics have also shown trends suggesting stagnation in Indian science. However, studies done so far are limited in their scope and issues addressed. Quantitative studies have also suffered from lack of comprehensive database covering the full research output of the country.

The estimate of the scientific output of a country depends primarily upon the kind of databases used and the extent they are able to cover the overall research output. So far estimates made about scientific output from India are based on few sources, such as Science Citation Index (SCI) (@ ISI - Institute of Scientific Information, USA), which has a very limited coverage of Indian domestic journals. In addition, there are studies based on international databases, in subject fields. These databases exhibit good coverage of national and international sources within the subject domain. These databases although more comprehensive than SCI in their individual field, have major limitations in terms of their coverage in bibliographic parameters. For example affiliation of only first author is given.

Further to get a more complete picture of overall activity in various research fields, integration of the different subject specific database is required. As the subject specific databases do not exist in all fields of science and technology, only a partial research activity can be uncovered. Due to limitations in using SCI as well as subject specific databases in properly estimating the coverage, there is an urgent need to estimate the true size of our scientific output. This is only possible, if we decide to develop our own national databases, which could later be regularly used to map the contribution of Indian science in terms of various kinds of research outputs, and then identify in terms of publishing activity the strong and weak areas of Indian science, impact of science in different areas, identify important sectors, institutions and individual scientists contributing to Indian science, identify collaborating countries and areas of collaborations and study the geographical distribution of science, etc.

Present Status for Estimating Indian Research Output

Our scientists publish their scientific results in various kinds of outputs such as books, reports, conference and seminar papers, thesis and papers in scientific journals. The technical outputs are covered by different forms such as patents, products and processes developed, import substitutes and design prototypes developed, etc. The reports, papers covered in conferences and seminars and thesis frequently lead to research papers at the later stages. Among the various kinds of scientific outputs, papers published in scientific journals are considered the most important part of total research output as it depicts the primary research activity in a field.

Research output in journals acts as surrogate measure of research activity in a field or subfield. Analysis of research output can indicate: research activity among different fields or subfields; research activity across institutions; can delineate important institutions based on research output in different fields or subfields; analyze their relative strengths and weaknesses in terms of publication in different areas; can identify institutions with similar research patterns; depict linkages among research institutions based on number of joint research papers across institutions and identify fields/subfields where linkages are prominent. Further it is possible to undertake relational analysis of publication-based indicator with other output indicators; for example between quality (based on citation impact) and quantity of output.

Research output from Indian scientists can be divided among papers published in Indian and foreign journals. We look at the available data sources of Indian research activity, to what extent they are useful in estimating the overall Indian research activity and caveats in using them for this purpose.

Estimating Indian Research Output through International Databases

At present SCI (Science Citation Index) database is most suitable for mapping Indian research activity. SCI is also the most preferred source for international benchmarking of research activity primarily because of the following characteristics: (a) multi-disciplinarity; (b) selectiveness; (c) completeness of address; (d) bibliographic references and (f) availability. Citation analysis is possible only by using SCI. Citations given as well as citations received by each paper (in the journals being covered) are available. This allows for impact analysis based on citations of published outputs. SCI can be used (inspite of its limitations) to uncover the leading Indian universities and research organisations, high impact Indian papers, most preferred journal by Indian researchers in each discipline, most cited Indian authors, etc.

Journals covered in this database are qualified by indicators like impact factor (IF), immediacy index, half-life. This gives insights into each journal in terms of what can be the expected IF of a paper inside a journal, how quickly (in an average) the papers in it are cited, etc.

Database would have to be developed from the SCI data (in our case, the Indian data) and requires cleaning, value additions and creating suitable access tools for retrieving the data in a proper format. Major variations are in address fields and require a uniform standard. It is also essential to be aware of the limitations of SCI and implications in using it in the Indian context. Some of the caveats that would apply are perceived as follows:

(a) Indian publication output can't be properly estimated through SCI.

There are around 2255 S&T periodicals published in India. Large portions of the Indian scientific outputs are covered by these journals. SCI covers only eight to ten Indian journals. Thus a substantial portion of Indian scientific output would be missed through SCI. However, Indian output as reflected in international journals will have much better estimation through SCI.

(b) A practical problem arises in using the SCI to count publications over a period of time.

Since its inception in 1961, SCI has expanded from 600 journals to 3000 journals in 1981. At present around 5000 journals are covered by SCI. As a result, there can be measurement error in the publication counts in time series analysis.

(c) International journals will not cover areas that address research problems related to Indian context.

Medical/clinical research papers dealing with tropical diseases; diseases that are mainly prevalent in India like kalazar, arsenic poisoning etc will not be covered in international journals. One would find sparse coverage in areas dealing with diseases like tuberculosis, malaria as they are not of major concern for the international community. Similarly localised agricultural and environmental issues and their research solutions will have sparse coverage in the international journals. Other measures derived from publication outputs like co-publications, identifying prominent institutions will have the same limitations as above as identification would focus on institutions that publish in SCI covered journals.

(e) SCI being multidisciplinary database does not provide a direct subject assignment for recorded papers.

Lack of an appropriate subject heading system in SCI results in usage of versions of ISPs subject heading category schemes published in annual science citation index guides and the ISI journal citation reports (JCR). Since journals are not often deviated to a single topic, assignment of subject areas through journal classification is necessarily less precise then that based on subject headings of individual papers. Thus this is an indirect subject assignment of individual papers and is only indicative of the broad subject field of the paper.

Inspite of these limitations, at the first level SCI is most suitable for assessment of Indian research activity based on scientific output as a proxy measure, hi the light of the above features of SCI, especially the need to measure the EF of the Indian papers based on citation analysis, we will have to use this database in measuring the performance of Indian research as indicated by publication profile. However, one has to address the limitations in the long run as relying only on it will reflect Indian scientific activity partially.

Web of science database published also by ISI covers a wider set of journals then SCI and thus can provide a better estimate of Indian activity. Not only more journals are covered in this database, a much higher number of Indian journals are covered in them (approx fifty Indian journals are covered). However, it has to be kept in consideration that coverage in web of science includes journals in social sciences as well as in art, and thus not restricted to natural sciences. Secondly, international benchmarking is still done through SCI.

Indian outputs as covered in subject specific databases like (a) INSPEC (physical sciences) (b) BIOSIS (life sciences) (c) Darwent (engineering sciences) (d) CAB abstract (agricultural sciences) can reflect the discipline wise research activity. This will help in getting a more comprehensive coverage of Indian activity field wise as in comparison to SCI journals in a discipline are covered in much more details in these specific subject wise databases. Major disciplinary journals in India are covered by each of these specific databases. Subject classification in these databases are paper wise allowing for better classification of activity in subject field/sub-field levels.

Creation of Databases from the International Sources

As indicated earlier, the analysis of Indian research activity using the above international databases require data to be downloaded from these databases and then converted to in-house databases. The data has to be cleaned so that it allows for proper retrieval of research papers by authors/institutions. In this regard variations in institutional address, journal title abbreviations are to be made uniformly standard. Value additions are required for example to take care of subject field-specific variations in impact factor, etc. Search software's are to be written for retrieval of records in different formats as required for analysis. This exercise would lead to the proper estimation of Indian research activity as covered in international journals and in some Indian journals that are internationally accepted. However, it is essential to cover the Indian research activity in Indian journals to properly estimate the research output of the country.

According to Ulrich directory of World Serials, more than 50,000 journals are published in the world in science and technology alone. But we have absolutely no idea, in how many of these foreign journals Indian scientists are publishing research papers. We must make an assessment of Indian publications in foreign journals; country of origin of publication, subject coverage of journals, their quality, how many of them are peer reviewed, citation received by Indian scientists from these publications.

Estimating Indian Research Output through Papers Published in Indian Journals

According to R&D statistics published by DST, around 2255 scientific and technical journals were published in India during 2000. However, there is no idea as to how many of these journals are research journals or popular science or technical journals; kind of research outputs they produce - research papers, short communications, review papers, letters to editors, etc.; whether research output is available in regional languages sources; how many of these journals are peer-reviewed; who are publishing these journals - academies, societies, institutions, private publishers, etc; who are publishing papers in these journals - Indian scientists or foreign scientists; how many of the papers published in these journals are ever cited; how many of these journals are covered in international databases and information services, etc.

Let us first look at the present efforts being carried out in the country to document Indian literature, particularly the research papers published in Indian journals. The major efforts to index, abstract and develop a computerize database of Indian literature in S&T is carried out by National Institute of Science Communication & Information Resources (NISCAIR), New Delhi. Based on its efforts, it is bringing out Indian Science Abstracts (ISA), a fortnightly information service covering abstracts of research papers published in 1000-1200 Indian journals, in addition to information on patents, standards and thesis. It also covers selected papers published by Indian scientists in foreign journals. In the field of agricultural sciences, all major Indian research journals are documented by Agricultural Research Information Center, Indian Council of Agricultural Research, New Delhi as a part of AGRIS, an international information system. In the area of food science and technology, NICFOS, Central Food technological Research Institute, Mysore is collecting, indexing and developing a database of publications from Indian journals as a part pf FOSTIS database, an international database.

In the field of biomedical sciences, ICMR-NIC, New Delhi is also developing a database (IndMED) (also available on internet) of articles published in 78 peer-reviewed Indian journals for the last few years. Similarly, Indian Council of Medical Research (ICMR), New Delhi is collecting, indexing and developing a yearly database of the research output (published in Indian and foreign journals) of all its research institutes.

In the field of nuclear sciences, Bhabha Atomic Research Center (BARC), Library and Information Center, Mumbai is developing a national database of about 1000 to 13000 articles per year as a part of IMS, an international information system. Similarly in the area of renewable energy and environment, Tata Energy Research Institute, New Delhi is developing a very comprehensive database of Indian and other SAARC countries publications. The Ministry of Environment has also developed a national information system (ENVIS), which is compressively documenting and developing a database of Indian literature and it is also bringing out a quarterly information service.

In plant sciences, the most significant efforts are again carried out by NISCAIR, New Delhi in developing a MAPA database of Indian and foreign publications in aromatic and medicinal plants. Some efforts in this direction are also carried out by CIMAP, Lucknow in the same direction. In biotechnology, besides subscribing to international databases, the distributed information centers under the biotechnology information system developed by Department of Biotechnology is developing a national database of publications from Indian journals. The National Institute of Oceanography, Information Center, Goa is developing a major database of all Indian articles published in the field of oceanography.

In the field of applied or engineering sciences, the major indexing of Indian literature has been carried out by Central Leather Research Institute, Chennai in leather and allied industries, Ahmedabad Textile Research Association, Ahmedabad in textile and allied subjects, and Central Machine Tools Institute, Bangalore in machine tools and production engineering.

Limitations of the Present System

There are number of lacunas in the existing efforts. These are briefing mentioned below. There is a considerable amount of duplication in terms of coverage in these databases and services. All the subjects are not systematically covered by the above mentioned information systems and services. Many of databases and services brought out by Indian institutions and mentioned above covers information in a very limited and selected way publications of Indian scholars in international journals. Such information can best be derived from international databases, such as Web of Science, Science Citation Index, INSPEC, Biological Abstracts, Chemical Abstracts, Engineering Index, etc.

There is no uniform system of classification used by most of these databases and services. There is no uniform system of indexing and coding information on articles in these databases and services. These databases are also using different database management software's. We have no idea as what extent Indian journals are indexed by these databases and services.

Plausible Approach for creating National Database

Due to drawbacks in the present system of collecting national information, there is, therefore, urgent need to develop a national database of information on articles published in Indian journals. No single agency should be responsible for collecting the entire information on articles published by Indian scientists in Indian and Foreign journals.

A National Committee should decide the nature of database to be built, the kind of software to be used and developed, the kind of information to be included, the type of classification to be used, and the type of institutions to be involved in collecting this information. This committee can later be used as a monitoring committee for evaluating information to be collected from time to time. The two following models can be used for collecting the entire information.

First Model

A nodal agency can be designated for processing the entire information and also developing the necessary software for the database and subsequently launching it on Internet for wider use. To effectively collect the entire information, we should follow the method of separately collecting information published by Indian scientists in foreign journals and by Indian scientists in Indian journals. For information published in foreign journals, information has primarily to be derived from international databases and later standardizing such information on a common format. For information published in Indian journals, a strategy has to be adopted for collecting information. In such a case journals have been identified according to subjects, and canters already working in this area have to assign the task of collecting, indexing and putting it on a communication database format systematically. The approach in creating the bibliographic database of Indian outputs can be undertaken in phase wise.

At the first stage only peer-reviewed journals can be covered as significant research output is published in them. As articles published in them go through a review process, some degree of quality is expected in them. At the later stages, the coverage should be systematically increased to include other journals.

Second Model

More than ninety percent of the information on the research papers published comes from research institutes under the government departments, commissions, and research agencies. In such a case, which can make the all the concerned agencies responsible for collecting such information on a common well-defined format and then ask them to furnish such information to a centralized agency for finalizing processing it for further use. The government can bring an executive order in this regard.

Other Complementary Efforts

Efforts recently carried out by China in developing national database on S&T publications and also in developing a National Citation Database need to be carefully studied in this regard. There are other useful value additions in their database namely age, sex, etc. This type of database developed for India would be very useful not only to the researchers but also policy planners and decision makers. We should also undertake efforts to include more journals in SCI. This is possible if we (scientific community in India) care about our journals and play a pro-active role in improving the quality. One of the approaches can be by selecting journals in each discipline based on expert judgements that these journals have quality inputs. Further improvements can the selected journals should be systematically made so that any shortcomings are addressed and they meet international standards. The factors to be especially taken care of are their timeliness of being published, revamping the editorial board as per requirement, editing the journals in the international format, references in proper systematic manner. The contents can be improved by inviting eminent scholars to edit special issue, providing institutional incentives to scholars in publishing in these journals, etc. A strong case can then be made for their inclusion in SCI. A major initiative in this regard should be to make these journals noticeable especially among the disciplinary peers (world-wide) as their pressure plays an important role in a journal being ultimately covered in SCI. ❑

Internationalization of Education : Two Perspectives

S C Behar

(Makhanlal Chaturvedi National University of Journalism, Bhopal.)

Negotiations are still on. There has been no consensus or final agreement on internationalization of education. Hoping that some or the other form of agreement will ultimately be hammered out, many foreign universities have already obtained a foothold or in some cases more than a foot hold in India. Others are in this process. Taking advantage of an uncritical attitude of students and parents to accord higher value to degrees of foreign universities, some of them are doing good businesses. As a consequence, many foreign universities are having a field day.

This is the right time, therefore, to deeply and comprehensively deliberate upon the pros and cons of internationalizing education. The Association of Indian Universities deserves acclaim for taking up this theme for deliberation in its annual conference.

Let us first reflect on and, examine the objectives and motives behind pushing so hard the agenda of internationalization of education. The first hypothesis can be that their motives are altruistic. They want to help us. Their move in our interest. Those countries and universities working to expand beyond their national boundaries are genuinely interested in providing the same quality of education to the host countries that they maintain in their main campus in their own country so that same quality of talent pool as they have in their own country becomes available here. If this hypothesis is correct, the best of the Universities from United States of America, United Kingdom, France, Germany or for that matter other developed countries should move to the developing countries creating comparable infrastructure and shifting to these new campuses the Nobel Laureates for which they are renowned. The entry should enable the host countries to produce intellectual giants, Nobel Laureates, scientists and thinkers so that in a decade or so the comparative disadvantage the developed countries have should disappear and the so-called developing countries should compete on equal terms with them. This hypothesis cannot be sustained on the basis of what has they would, come forwarded with a quality of so far happened and what seems to be in the pipeline. Also, the background and the context in which the move for internationalization of higher education has gained momentum do not support it. General Agreement on Trade and Tariff is the prime mover in this regard.

The entire concept of intellectual property is highly debatable. Can the discovery relating to genitics be considered a discovery of the present day scientists, completely ignoring the role and contribution of scores of scientists devoting their lives to research in genetics starting from Mendel. This concept in contrary to the most laudable spirit of the so ably voiced by Issac Newton when he, with characteristic humility, declared that his contribution was possible because he was standing on the shoulders of giants' that preceded him. Not satisfied with these questionable practices in the trading of goods and the potential profit therein, is the World Trade Organization, the nodal agency for economic globalization. It is in this context that education is sought to be «v internationalized. The motive, therefore, is trading not spreading high quality comparable education globally. Trade by definition is for motive. The developed countries are pushing the agenda of economic globalization with an unequivocal motive of maximizing their share and profit in the protracted negotiations have un-ashamedly demonstrated the via in favour of developed countries. An example is the way developed countries subsidize agriculture in their own countries, while pressurising the developing countries to reduce and abolish similar subsidies. This is further amply demonstrated in their approach to intellectual property rights. Age old herbal, ayurvedic and other reminders widely prevalent in India and other developing countries are being patented. Even traditional varieties of crops -paddy, maize etc. are being taken up as their own for patenting and exclusive rights. They are also seeing huge opportunity in trading of education, particularly because the people in a large number of developing countries, because of their colonial past as also because of a might, power and influence in the contemporary world of these developed countries, consider their education, higher quality. This "goodwill" is sought to be converted into monetary gains by declaring education as a service that should be marketed, bought and sold in the same manner as manufactured goods. Profit, therefore, is the motive

On the basis of the analysis above, it can be safely predicated that if globalization of education materializes the foreign Universities will offer to the host countries only that quality of education, which will maximize their profit. It will certainly be attractive and tempting enough to ensure large enrolment. It will equally certainly be worse than what they offer in their own campus. They would not like to pose a threat to their superior status in the world by developing Noble Laureates in the host countries. These Universities are unlikely to promote research that will the technological superiority of their own countries, which is the main factor behind their world leadership. They will give a quality of education and promote kind of research that will be supportive, that can assist them.

Through internationalization of education, a world educational order is being sought to be created in which the developing countries should usefully play the second fiddle. They wish to build capacity in the developing countries, that is adequate and necessary for this supportive role but they would not like to take it to the level that matches their own. Despite all the noise about the achievements of the persons of Indian origin, one can clearly see this pattern when one notices how the achievement is only supportive to some higher level achievements of others. After all how many Non Resident Indians have obtained nobel prize or similar acclaim?

In this context one is reminded of the theory of 'development of underdevelopment' propounded by the Latin American economist A.G.Frank in the context of economic development. According to him since undeveloped countries cannot be of much use as assistant or support to the developed countries they help the former to develop up to the stage of 'underdeveloped' where they became good assistants. He believes that underdevelopment is not a stage in the process becoming a developed country but the nature of the stage of underdevelopment is such that a country that has achieved this stage will stagnate there. Through internationalization of education, a similar situation is being designed in the intellectual arena. The products of such education in developing countries will never be (rare exceptions apart) intellectual leaders, but merely able support to the leader.

An illustration and simile may be in order here. An engineer needs the help of a diploma -holder, the product of a polytechnic to relieve him of that part of job which does not need his level of expertise. Unskilled worker cannot perform the role. A skilled worker trained in an Industrial Training Institute may also not be adequate for the purpose but he can be a good assistant to the diploma holder. It seems that the developed countries want some developing countries to develop the competency akin to diploma -assistants while same will be helped to acquire competency of an ITI product. This is development of underdevelopment in the arena of education. This is already evident in the field of information and Communication Technology. Notwithstanding our pride of our achievement in this, we, at best, are software developers. How many computer languages have we developed?

The motive and design behind the advocacy of borderless education has been dwelt upon at some length because threats and opportunities cannot be assessed properly without an understanding of the motive.

After all threat or opportunity when a knife is likely to be used on one's body, does not depend upon the sharpness of knife but on the person who is, and the motive with which he is, using the knife. A surgeon may be using the knife to treat diseases which is a highly desirable and laudable opportunity to become healthy and improve the quality of life. A robber may use the knife to force one to part with valuable. This is a situation in which there is a serious threat to one's body and even life. Threats and opportunities in internationalization of education can similarly be assessed only after there is a clarity about the motives. Education in every country is seem as the most potent vehicle of developing people who are capable of, and have the commitment for, contributing to the achievement of national goals. It is in this context that Kothari Commission argued for education for material development. The concept of education is very wide. Different goals give rise to different kinds of education. A serious problem that may arise in borderless education is the incompatibility between the national goals of a country and the aims and objectives of the educational package of the foreign educational institutions. Educational goals are derived from and closely linked with national goals. Educational goals of a country will be linked with its own national goals. The goals and aims of a foreign university can be compatible with the national goals of a host country only if the national goals of both the countries match.

It is not possible in the contemporary world to know common global goals to which all countries fully subscribe. A cursory glance at the international scenario will amply testify this. USA in recent years, has given a clear message that it sees itself as the ruler of the world and would not accept dissent. The European countries are uncomfortable with this but do not find themselves in a position to directly challenge this. Russia is too much in a disarray to bother, though in deference to its earlier superpower status, it does make symbolic noises of dissent. Non -alignment movement, after the emergence of Uni-polar world has lost relevance. The developing countries, or the South, as they are called have common interest on many issues but also have divergence of interest on many others. Therefore, they cannot have identical national goals. In any case international relations are still in fact governed by national interest, and all the rules, laws etc. are flouted with impunity by those whose interest demand such a course of action.

There are factors complicating the situation further. How can secular countries have goals common to theocratic states. Dictatorships—military or otherwise—cannot share the goals of democracies. Authoritarian rulers expect from their citizens a code of conduct very different from truly democratic governments. Taliban dominated Afghanistan alleged to be committed to international terrorism would have a kind of education that in no way will suit a peace-loving democratic country. An educational package developed in and for a secular state may amount to blasphemy in a theocratic country. The one developed for a free country may be perceived as preaching anarchy in an authoritarian regime. In this kind of a situation internationalization of education is likely to be counter-productive and may lead to unforeseen consequences beyond control. It is obvious that the national goals of any country are determined by a number of factors demanding very different package of education. It would be unfair and unjust to force a package of education developed for a particular country to another country.

Education is also firmly embedded in its cultural context. Values, ideals, beliefs and a moral code of conduct are essential ingredient of a culture. In the context of society and culture, education plays somewhat paradoxical functions. It is the most important vehicle and process of transmission of culture which importantly includes the entire gamut of value system, ideals, beliefs mores and code of conduct. In this sense education is an important facet of socialization, it purports to develop useful and conforming member of a society steeped in local tradition, custom, rituals. It in a way is a process to maintain the status quo. Education for good citizenship is a camouflaged version of this kind of pro status quo education. This breed of education promotes orthodoxy. We may call this education for developing conformists There is another contrary function of education. It inculcates a questioning mind a scientific attitude that examines critical by whatever exists. Such an education is also based on an alternative vision of society. Education conceived in this manner develops rebels and social activists, who challenge the contemporary norms, values, traditions, customs and thereby contribute to the process of change in society. Education of the first kind reinforces orthodoxy, the other promotes change. Education in each country has to find a balance between these two opposing functions. A dynamic forward looking society adopts educational package which has much higher change content. In contrast the orthodoxy-reinforcing education characterised a stagnant society.

Education reflects the culture which is an integrated whole of a member of highly and closely inter-linked components. What is to be reinforced and what is to be changed varies from culture to culture. Since all the components are so integrated, the dynamics of change has to take care of possible cultural lag, cultural dissonance and cultural dysfunction, which may be the consequence if change is not properly directed, strategized and visualized.

Value systems and beliefs vary across culture. A permissive society does not frown upon pre-marital sex as strongly as an orthodox society. In Pakistan as well as in India and other countries of South Asia one comes across the news of a daughter being killed in the name of family honour because of an affair even though with an eligible boy only because he belongs to another caste, lower social status or even because she has conceived before marriage as a consequence of alliance with a boy of the same caste. Contrast this with western countries where dating and making boy friends as soon as since the girl becomes an adolescent is the norm. Indeed if she does not behave in this fashion, the parents will become concerned and try to look for and remedy any possible abnormality. Western education in a society ridden with traditional values, social hierarchy, ethnic divisions and many other forms of groupings may lead to unforeseen social disorganization, conflict and serious disruption of culture. Education is integral to culture and has to exhibit high degree of sensitivity.

Educational package develop within a culture may prove to be disruptive in another culture. Besides, students who receive such education may prove to be misfit in their own culture. It can also have serious psychological repercussions. As a consequence, suicide rates, may go up, depression may become a wide spread phenomenon, crime rates may go up, adolescent delinquency may rise and similar other symptoms of social pathology may be acutely felt.

It is unfortunate that the entire discourse on internalization of higher education is ignoring this cultural embedded-ness of education and the social disorganization and social pathology that may be witnessed if there is a mis-match between culture and education which is likely to happen if educational package developed in one country and cultural context is pushed in another country in the name of globalizing education.

The advocates of border-less education and opponents conceive education very differently. The former have an economic view of education while the latter have socio-cultural perspective on education.

The economic perspective on education aims to develop students that will be useful in the job market. The job opportunities, and the needs of the economy are the driving force for this educational package. In this view information, knowledge, skills and competency required for the vocations and professions in demand are the major focus of the educational package. Economic view of the education aims at developing 'workers'. Human aspects, social cultural needs of the 'worker' have no place in it. It may be a little harsh and yet it will make matters clear if we say that this perspective on education wishes to create working machines-robots. If we adopt a futuristic approach, we may visualize a situation when such education will be irrelevant because robots would have developed that can perform these functions with greater efficiency, speed and accuracy. Automatic Teller Machines have replaced the need of cashiers who are adept in counting currency notes and coins or accountants expert in maintaining correct accounts.

The socio-cultural perspective of education aims at developing a fine human being. What is fine is culture specific. A fine human being is one who excels in the values, ideals etiquette and a code of conduct cherished in the socio-cultural milieu. This cultural specificity of education is the primary source of opposition to globalizing education.

Once the fundamental difference between the economic and socio-cultural perspective is appreciated, the reasons for the divergent views become clear. In fact this clarity will lead to the inference that both views are rational since they arise from the internal logic of the two different perspectives. In this view of the matter neither favouring nor opposing internalization of education is irrational. The choice between the two is not a matter of rationality but is determined by the value system and perspective of the one who is making the choice.

Those of us who subscribe to economic perspective of education will be strongly in favour of globalization of education because to them it is a process that must go on concomitant with the process of economic globalization. After all jobs, professions and vocations will acquire the same character world-wide and demand similar skills, professional competencies and knowledge. The only fallacy and catch in this is the truncated nature of the process and conceptual frame of economic globalization, which promotes free flow of goods and services across countries but does not want similar unrestricted flow of human resources. This truncated-ness emanated from the vested interest of the developed world which wants a world economic order where the whole world becomes a market for the goods produced by them and services by render, but would not like to be overwhelmed by immigrants from the densely populated developing countries. Ironically the leader of this developed world namely United States of America as currently composed is a country of migrants from Europe. Probably they do not wish history to be repeated, as seems quite probable to happen, if one were to judge by the increasing importance Asian migrants are acquiring in some developed countries including USA and UK. In the absence of free flow of human resources the logic of similar job requirement and accompanying similar education gets partially flawed. Even technology that is projected as leveler reaches developing countries at the mercy of the inventor developed world, which choose the timing, spread and 'generation' of technology for the purpose. The allegation that outdate technologies are exported to developing countries has a grain of truth, if note fully accurate.

One who has economic concept of human being, who believes that work, success in career or profession is the be-all and end-all of human life would naturally favour economic perspective of education and will be enthusiastic about globalizing education. Those who focus on human beings with a sense of purpose beyond mundane career, professional excellence and economic success would support a socio-cultural perspective– of education. They would argue for a culture-sensitive, cultural-specific education that aims at developing specimen of human beings who are be in the process of evolving towards super-human being. Though it is not exact and accurate, yet it would be close approximation if one view is called materialistic and the other non-materialistic (since spiritual would be an expression not fitting too closely). This branding also gives a glimpse of the philosophical roots of these two divergent views. Educational perspectives invariably have deeply rooted philosophical foundations. Unfortunately they remain implicit and unarticulated, which is highly misleading. Many who chose one or the other view may feel uncomfortable it if they were to understand this philosophy. That is probably the precise reason why the philosophical foundations are kept underground. Nothing about education is without an implicit philosophical framework and a hidden value system. Quiet often without realizing this a point of view is adopted or advocated by innocent believers. One can only say beware everything about education is a hot stuff, and what is visible is the tip of the iceberg! One wonders whether those who are sailing in the ship of internationalization of education are ignoring the iceberg of socio-cultural disruption by only looking its tip without realizing the deeper implications!

Proponents of job oriented economic perspective of education may argue that their educational package being only job related is value neutral and therefore, cannot have the kind of socio-cultural psychological implications outlined here. While this may seen to be plausible on the surface, a deeper analysis would expose the fallacy of such a position. No educational process can be value free or culture neutral. There is always a hidden curriculum, whether intended or otherwise. A job oriented education will necessarily inculcate the value of competition. After all the entire economic paradigm, the principles on which the economy works, the economic processes and functions are both based on a set of values and even on the assumption of a model of human nature. If they are clearly articulated, many who otherwise believe in the economic view-point to find reasons strong enough to disagree with one or the other part of these since the philosophical under-pinnings and the set of values implicit in such education may be incompatible with their social and moral beliefs.

The economic perspective places competition center stage. It believes that the human being is essentially self-centered and is motivated to work for personal gain and only in one's own interest. The societies and cultures that still value community-life will find this starkly individualistic view of human beings in-compatible with the concept of human nature embedded in their culture. Social harmony and community-spirit are based on the belief that human being are essentially social - not individualistic - seek each other's company and support and are therefore, willing to eschew self-interest in the common interest of the community. To put it bluntly, one believes in selfish nature of the human while the other believes in altruistic nature. Competition and co-operation are the nucleus of the two opposing value systems on which the entire philosophy and system of free market and state intervention are based. Competition and free market emphasize efficiency, cost-effectiveness and argue for elimination of the inefficient and non-productive. Community-co-operation, community-spirit and accompanying strategy of state intervention accepts the differences in capacity and would like the group to function as a team in the spirit that highly efficient and less efficient supplement each other and therefore must co-exist. No human being, whatever be the efficiency level is dispensable. The dignity of value of a person is inherent in his/her being a human. It cannot and should not be judged on the basis of his/her assessment as an economic productive asset.

Education that promotes the value of competition will prove to be dysfunctional in a culture and society that is seeking greater social-harmony community-spirit and social advancement. Conversely, education promoting community spirit will be misfit in a culture dominated by individualistic free market philosophy and competitive spirit.

The phenomenon of brain-drain is an example of this kind of dissonance. In many developing countries like India the technical education imparted is based on the implicit unarticulated individualistic philosophy, while the country really needs altruistic community-spirit. The products of Indian Institute of Technology, other prestigious technical institutes as also the IIMS and the like migrate to developed countries in search of higher remuneration or in the name of better infrastructure or other facilities for research. Their decision to migrate is based on their own self interest and unwilling to put the interest of the country and the community above their own. The economic perspective of education that permeates the educational package offered by such institutions does not inculcate social commitment and community spirit that would make brain-drain appear reprehensible to their pass-outs. To them self-interest is the natural choice without any stigma attached.

The foreign educational agencies are likely to bring an educational package that has implicit value system embedded in it that derives from the prevalent value system of the society and culture of the country of origin. Rules and regulations cannot prevent this phenomenon in the absence of sophisticated tools that can uncover the hidden value system of an education package before its impact is visible. We will therefore, be placed in a situation of being 'wise' only after the event.

The case presented so far should not be read as a case against entry of foreign universities in India. It is a case for adopting a socio-cultural perspective on the issue. Even if Indian educational institutions go to an African country disruptive influence on the local socio-cultural fabric and dysfunctionality with its national goals as outlines here are likely. It is a case against globalization of education disregarding its cultural and national context.

We may now pay a little attention to the specific case of India. Social stratification, hierarchy and iniquities pose a serious challenge to our progress towards the kind of society enshrined in our constitution. Border-less education could be a welcome move were it to enable this country to meet this challenge. Just the contrary seems to be like. Education is going to be marketed in this country by foreign agencies as they are coming here for profit. It is likely to be costlier than what is available in the indigenous educational institutions. It will also claim to be, and is also likely to be, of higher quality. National Assessment and Accreditation Council's assessment of educational institution has already exploded the myth of equivalence. Even before that it was widely understood and expected that different educational institutions provide different quality of education although all of them award the same degrees. No body ever believed, for example, that Indian Institutes of Technology, Regional Colleges of Engineering, Government engineering college and multitude of private engineering colleges that witnesses a mushroom growth in the past two decades offered the same quality of education. The entrance tests for these institutions and the process of counseling in which aspiring students indicate their preference for institutions more than clearly demonstrate the caste hierarchy existing our educational institutions. Similar is the case of other faculties and sectors of education. NAAC's functioning has formalized and legalized this caste system in the education structure. In this, a new, (likely to be upper) caste of foreign educational institution will be grafted, once global education becomes a reality.

Even today, there is a small number of students (small compare to the total strength of students) who can afford costly foreign education, going abroad for education in foreign universities. Many of them settle down there. Those who return are so few that they do not constitute the upper most caste of the educated. With the foreign universities coming into India and their education being much less costly than going abroad and getting education but being much more costly than most of the indigenous educational institutions, larger number of students hailing from the burgeoning middle class, which is really the target group for the foreign merchants of education can be expected to enroll in and obtain degrees from them, giving rise to this new upper caste of the educated. Bulk of the student population cannot access this, despite measures of positive discrimination of the state. Availability of foreign education within the country therefore, is likely to accentuate the existing hierarchy in education and through that also in the society, which will be subversive of the constitutional dream of an egalitarian society.

Possible impact on Indian educational institutions will be differential. There is a small number of institutions that have the capacity or can acquire the capacity to compete and the challenge of the new entrants. They will improve their quality further and would devise strategies and take steps to compete with the foreign entrants. This can be seen as a positive impact on them. Institutions located in back waters and catering to the student population that can afford limited geographical mobility will neither be adversely impacted nor will have the inspiration to compete, being fully aware of the improbability of any such venture. Bulk of the institutions that currently provide high to moderate quality of education but cannot muster, resources to enter the competitive world of the emerging education market would be the worst sufferers because it is their clientele that is likely to shift to the costly locally available foreign education. This analysis challenges both the two rosy and optimistic picture painted by some and equally dismal and pessimistic one presented by others. We cannot do anything better than these broad trends in the absence of adequate data on the institutional quality, students' socio-economic and mobility profile, current resources, capacity to raise additional resources of all educational institutions in the country. More over the dynamics and the churning towards a new configuration of educational domain, on internationalization of education has no precedents to go by except in respect of import of manufactured goods, which also was a gradual and carefully calibrated process. We will revert to lessons this has to offer.

At this stage a quick look at the possibility of Indian educational institutions entering *foreign markets* is in order. The countries where Universities of developed countries would like to enter, our Universities will have to compete with them. Only the top institutions of this country will be in a position to enter the fray. Even so Universities of developed countries will have an edge over our Universities because of the preference for them in most of the countries which have been colonies of European Powers. Opportunities for our institutions, in such countries will be limited. The countries that are not considered to be good enough market by the universities of developed countries will be the potential market for them, provided they are English speaking or are willing to accept English Indian languages as the medium of instructions the latter being highly improbable. Advantage of this residual market therefore, can be taken by only those Indian educational institutions which have maintained a high degree of English teaching-learning culture.

Those who successfully adopted Indian languages as medium of instructions during the popular upsurge against English during 60s and 70s and therefore English language is no longer their strength, cannot look forwarded to any gains even in less developed countries with a British colonial past.

After this very brief reflection on the possible opportunities, we should revert back to the main thesis of this paper namely the socio-cultural implications and impact of foreign educational institutions expanding their out reach in any country. As we have seen, education, however, secular, innocuous and job oriented it might appear, transmits culture. The indigenous education system of any country transmits its culture, while foreign education imparts foreign culture. In the mid 20th century colonies of the European countries became politically independent, but many of them, which witnesses do sufficiently long duration of colonial rule enabling the colonial power to dismantle indigenous education system and put in its place the European breed of education, continue to be intellectual colonies. The entire frame of thinking, value-system, world view and perspective on major issues of human concern of the educated elite are governed by and stem from the philosophical cultural frame work of the country that ruled. To put it bluntly the educated elite of these countries may be brown or black in colour but are intellectually and culturally closer to the European power that ruled them. It is wrong to assume that with end of the political authority from the colonies the influence of European power has vanished. On the contrary enduring influence amongst the elite is there everywhere to observe to such an extent that one can discern trends towards homogenization of these groups across countries. The elites of different countries under common foreign domination find much greater commonality between them to the masses not exposed to the European pattern of education prevalent in their countries. This is indicative of alienation of the elite form their own people but also emergence of a community of elite across countries. Karl Marx had gone a call to the labourers of the world to unite. It seems that without any such clarion call the elites of many countries are getting united. In any case it is much easier to unite them because of the commonality we are dwelling upon.

This trend towards homogenization which is also referred to as 'convergence' by some sociologists can be seen in many facets of the life style of these elite groups. The clothing, dress, food habit are tending to converge. National dresses are increasingly being replaced by the European suit, shirt, T-shirt, jeans etc. In any international gatherings almost all the persons are likely to be wearing suits and ties and therefore form their dress it is not possible to identify their nationality. Even their social institutions are witnessing trends of convergence. Extended and joint families are being replaced by unitary families. A monumental study in the late 60's by the sociologist William ID has documented in a convincing manner this convergence. Even the challenge to the institution of marriage and the modified practice of living with', though still primarily a feature of western culture, is gradually spreading its tentacles in the effluent a elites of non-European countries. This process of homogenization of non-material component of culture and convergence of social institutions is perceived by many leaders as threatening the very identity and the entire social fabric of their culture.

(Contd..on page no. 17)

Acharyas : Ancient and Modern

M S Valiathan, Honorary Advisor, Manipal Academy of Higher Education, Manipal delivered the 65th Acharya Jagdish Chandra Bose Memorial Lecture at Bose Institute, Kolkata on 30th November 2003. He said,"Even the interest of MNCs in natural products has much to do with public concerns in Europe verging on chemophobia regarding chemically derived drugs. Not surprisingly the research effort in Ayurveda in the East and West is almost entirely focused on herbal products and drugs from medicinal plants, thanks to their promise for improving health care and for the creation of wealth. While India celebrates *Caraka's* practice of Ayurveda to the extent of marketing Ayurvedic tourism, no serious attention is paid by the scientific community to the leads which, according to *Caraka*, seek 'to extend the domain of knowledge". Excerpts

Acharya Jagadis Chandra Bose was one of the builders of modern science in India. His endeavour broke traditional boundaries in science even as his powerful mind moved freely among varied domains of knowledge including literature and philosophy. After nearly a century, he comes through his writings and speeches as a brilliant and innovative scientist; as a supreme experimentalist; as a lofty idealist; as a citizen of the world with immense pride in India's cultural heritage; as a master of the written and spoken word; and as a connoisseur of beauty in nature and works of art. In his moving address on the dedication of the Bose Institute on 30th November 1917, he declared that the Institute was not merely a laboratory but a temple. What kind of a temple? His confident reply rings across decades. "The personal, yet general, truth and faith whose establishment this Institute commemorates is this: that when one dedicates himself wholly for a great object, the closed doors shall open, and the seemingly impossible will became possible for him".

In the Indian tradition, an *Acharya* is a learned teacher who guides and inspires his pupils through not only superior knowledge and proficiency but also through the vision of truth. No wonder Rabindranth Tagore called *Acharya* Bose a "young image of the old Rishi of Ind". To pay tribute to Acharya Jagadis Chandra Bose, it would therefore be appropriate to recall another *Acharya-Caraka* - who preceded him and whose authority remains undiminished after the passage of two millennia. Whereas a good philosopher or scientist would strive and contribute to the storehouse of knowledge incrementally, an *Acharya* whose concepts and works outlive him would invariably go beyond tradition, break convention and blaze a new trail. This is amply borne out by the lives of *Caraka* and Jagadis Chandra Bose who refused to function within the intellectual compartment that tradition had assigned and, in that process, broke new ground. Apart from intellectual greatness, they however share another characteristic which is the response they drew from their successors. While the descendants of the two *Acharyas* stuck to the traditional and conventional part of their legacy - often with skill and tenacity - they were loath, if not afraid, to follow the unconventional pathways opened by their predecessors. As departures from tradition hold the key to innovation and discovery, the timidity of response of the successors ensured that the course of Indian Science remained unremarkable for discoveries and innovations which would have global impact. To reinforce my theme on the half-hearted response in India to the innovative concepts and techniques of our predecessors, I would also refer to the story of Professor PK Sen - a pioneer in cardiac surgery - who built the Department of Cardiac Surgery at the KEM Hospital, Mumbai.

Acharya Bose: Response in the Living and Non-living

Acharya Bose's scientific contributions are well known. His novel studies on generating the shortest electromagnetic waves led not only to their production but also to the construction of a sensitive instrument for detecting them, which was far more sensitive than any other contemporary detector such as Oliver Lodge's. He continued to improve the detector to such a degree that a leading British Journal suggested its use in ships and electromagnetic lighthouses for communication and transmission of danger signals at sea through space. Bose was a supreme experimentalist and his ability to design and build highly sensitive instruments with Indian workmen and mechanics stood out throughout his career. In the latter phase when he turned to plant physiology, his instruments were far ahead of his time and they could detect and record events of time-interval as short as 1/1000 of a second. Patents were granted to him in the UK and the US but he never utilized them for personal gain. He believed that "the spirit of our national culture demands that we should forever be free from the desecration of utilizing knowledge for personal gain".

His shift from physics to physiology was prompted by his observation that his detector showed "instrumental fatigue" which resembled the fatigue of skeletal muscle. In his classic "Response in the Living and Non living" published in 1902, he recounted the work he had commenced in the Presidency College, Kolkata and completed in the Davy-Faraday laboratory in London and presented abundant data to demonstrate the following key findings among several others.(Bose: 1902)

- Metals, plants and animals are excitable and give electrical response to stimuli.
- The response in all three categories demonstrates additive effect, staircase effect and fatigue on the appropriate fusion, superposition or continuation of stimuli.
- Cold and heat (within appropriate range) inhibit or accentuate plant response; this is reproducible in metals and animals.
- Fatigue on continuous stimulation is seen in all three categories.
- Poison abolishes the electrical response in all three categories; anesthetic effect is similar but reversible.

In the entire range of responses among metal, plants and animals, Bose found no breach in continuity. He also said explicitly that the response to stimuli was determined not by the play of a mysterious vital force, but by the working of laws that know no change and that act equally and uniformly throughout organic and inorganic matter. The identity of reactions to drugs in plants and animals made Bose even suggest "a means of testing the effect of drugs under conditions far simpler than those presented by the patient, far subtler, as well as humane too, than those of experiments on animals".

As long as Bose confined himself to electric waves, he was applauded by the scientific community especially in Britain. But no sooner had he entered the domain of plant physiology, than a group led by Sir John Burdon Sanderson accused him of trespass and prevented the publication of a crucial paper he had presented in the Royal Society! This unofficial ban continued for ten years to the disappointment of Bose who braved great hardships to continue his research in the Presidency College. Even though the work came out of the shadows and won a measure of recognition in Europe during Bose's fourth scientific deputation (1914-15), one wonders whether it received adequate recognition from his Indian contemporaries. He was admired as a brilliant scientist who won recognition in Britain, Europe and America but his extensive work on plant physiology was not reinvented as a flourishing school of plant, agricultural and medical scientists who would follow the trail of integrative physiology that he had blazed. He had clearly recognized the implications of his research for agriculture and medicine and foreseen the possibility of substituting plants for animals in the evaluation of toxicity and other studies. All these possibilities which might have changed the paradigm of biomedical research were ignored and Base's path-breaking work was left unfinished. No less tragic was the fate of his highly successful efforts in building sensitive instruments - a technology which was far ahead of his time. He described no less than ten such instruments in his Presidential address at the Indian Science Congress in 1927, which could measure the growth of plants, the flow of sap, electrical response to manifold stimuli and many other biological phenomena. He was proud to claim that all the instruments designed by him were built by technicians and workmen in Kolkata. Unfortunately the technology of instrumentation that he pioneered was ignored by his countrymen who preferred the soft option of imports with crippling consequences for experimental science and instrumentation industry in India.

Professor PK Sen and the 'Snake-heart Operation'

Respect for *Acharyas* and indifference to their innovative heritage has another tell-tale example closer to our times in the life of Professor PK Sen who startled the surgical world with a paper on transmyocardial acupuncture or what he nick-named 'snake-heart operation' in 1965 (Sen: 1965). He noted that the muscle of snake heart was nourished by the direct ingress of blood from the ventricular chamber and the perfusion through a vast sinusoidal network. He argued that vital mechanisms for myocardial perfusion would not disappear in the evolutionary process even though they could be superceded by more efficient mechanisms such as a coronary arterial blood supply. He went a step further and claimed that the dormant sinusoids in the mammalian heart could be reactivated by a stimulus provided it was strong enough. He sought to create a snake heart model in the dog's heart by blocking the coronary artery and making a number of needle punctures from the outer surface of the ischaemic ventricle into the chamber. The *immediate* recovery of cardiac colour and function was noted in many experiments and the needle channels were reported to remain patent for weeks when the sinusoidal connections were presumably being established. The euphoria in the US which followed Professor Sen's report was however short-lived. Piffare placed a vein graft in the canine myocardium and observed that the pressure in the venous channel remained higher than the pressure in the ventricular chamber throughout the cardiac cycle, which meant according to Pifarre, that direct perfusion of the heart muscle from the chamber was a physiological impossibility (Pifarre *et al* : 1965). Pifarre's study sounded the requiem for Professor Sen's procedure.

It occurred to no one in those far-off days that micro-circulation through the sinusoidal system by blood from the ventricular chamber could not be disproved by the pressure changes in an implanted vein measuring 1.5 - 2 mm in diameter whereas the micro channels were 10 microns or less in diameter. Nevertheless, as soon as Professor Sen's procedure was abandoned in the US, Indian investigators followed suit and never cared to investigate its full implications for myocardial revascularisation. It remained for Mirhoseini in the US to take Sen's cue and employ a 100 W carbon dioxide laser probe for performing myocardial revascularisation twenty years later (Mirhosein: 1988). The laser puncture was computer-synchronized with the patient's heart beat and programmed to fire during the relaxation phase of the cardiac cycle. This procedure gained acceptance and is currently used for patients who have coronary artery disease with non-graftable vessels but good pumping function of the ventricle. A great deal of work and hundreds of papers later, it turns out that the mechanism of revascularisation by direct myocardial puncture - by stainless steel needle or CO_2 laser - is different from what Sen had envisioned nearly 40 years ago. Revasculatisation if fact occurs when angiogenesis is triggered by the combined stimulus of trauma and ischaemia. What is important in the present context is to note that Sen's pioneering work was ignored in India and no attempts were made to follow the lead he had given even though his initiative in open-heart surgery grew explosively. The failure of successors to follow the leads of Bose and Sen seems to be rooted in history because *Caraka* who lived in the 1st Century A.D. has not fared much better.

Caraka : The Physician Extraordinary of India

Who was *Caraka*? Where did he live? To these and other personal questions we have no definite answers. The *Samhita* named after him is the redaction of an earlier text called Agnivesa Tantra and constitutes the foundational text of Ayurveda. It was translated into Arabic and Tibetan in 5th or 6th Centuries A.D. and was well known in Central Asia and China. English translations appeared in the 19th Century and one of the first but incomplete attempts for an English translation was made by Dr Mahendra Lai Sarkar. Apart from the encyclopaedic coverage of diseases and their treatment and a strong philosophical undercurrent, what made *Caraka Samhita* a timeless classic is the undeniable fact that Caraka's teachings shifted the entire approach of Ayurveda from faith-based (*Daivavyapasraya*) to reason - based (*yukti vyapasraya*) medicine. *Caraka* was a master of adoption, assimilation and quiet rejection and used a combination of these measures in his approach to the Atharva Veda which was the mother of Ayurveda and to the contemporary systems of philosophy such as *Nyaya*, *Vaiseshika* and *Sankhya*. His definition of Ayurveda encompassed life as a whole, happy and unhappy, wholesome and unwholesome; illness and recovery were no more than phenomena which made the vast canvas intensely alive.

Ayurveda is based on several basic concepts which hardly ever change even as its techniques change and evolve. *Panchabhuta*, for example, dealt with the composition of the physical world and the homology between its constituents and those of the body. Tridosha, on the other hand, took its stand on function and postulated that the products of digestion - in the stomach as well as in body constituents - belonged to two different categories depending on whether they were assimilated or discarded. According to Ayurveda, it was essential for the assimilable and discardable categories to maintain proper proportions among themselves as well as in relation to each other. If the proportions were breached, disorders would follow even though the natural disposition of the body was to return to order. The three *doshas* - *vata*, *pitta* and *kapha* - belonged to the discardable category and outweighed other members of the group such as sweat and urine. Indeed one could claim that doshas dominated Ayurvedic concepts and practice because their imbalance signified disease and the restoration of balance amounted to recovery. Moreover the body constitution of each individual was influenced by doshas, and the manifestation of disease and response to treatment in each individual was determined by whether one's constitution bore the stamp of *vata, pitta* or *kapha*. There were other concepts which dealt with tastes (*Rasa*) as the determinants of qualities of food and drugs before and after digestion; adaptation to seasons (*Ritucharya*) and so on.

Caraka laid great stress on diagnosis which sought to identify the disturbed doshas in an illness rather than recognize and label a given illness as a disease entity. Similarly the aim of treatment was the restoration of disturbed doshas to a state of balance rather than the elimination of the cause of the disease. This was sought to be achieved by changes in life style, diet, physical procedures (*panchakarma*) and the administration of medical formulations. Ayurveda also prescribed elaborate measures for reducing the disabilities of ageing (*Rasayana*) and enhancing virility (*vajikarana*).

Ayurveda through Centuries

Caraka's Samhita became authoritative even though it had to be revised and completed by Dridhabala a few centuries later thanks to the loss of certain sections. Subsequent progress was slow but not negligible as shown by the addition of pulse for diagnosis, use of opium in the formulary and the treatment of syphilis, which was absent in Caraka's period. Ayurveda which was ignored, if not suppressed, by the State for a thousand years came into its own in modern India with hundreds of colleges, hospitals and drug manufacturers catering to 70% of the rural population. It has not only been recognized as an alternate system of medicine by the WHO, NIH and the Western countries but has also become a thrust area for drug discovery in the Western world. It is however a sobering thought that the wave of interest in Ayurveda in the West and revival in India came about through strong public opinion and not through scientific initiatives. Even the interest of MNCs in natural products has much to do with public concerns in Europe verging on chemophobia regarding chemically derived drugs. Not surprisingly the research effort in Ayurveda in the East and West is almost entirely focused on herbal products and drugs from medicinal plants, thanks to their promise for improving health care and for the creation of wealth. While India celebrates *Caraka's* practice of Ayurveda to the extent of marketing Ayurvedic tourism, no serious attention is paid by the scientific community to the leads which, according to *Caraka*, seek 'to extend the domain of knowledge'.

Challenge of *Caraka's* Legacy

Ayurveda offers much more than herbal products for the modern investigator who is at home with the tools of modern biology and organic chemistry. Taking a cue from Caraka, one could pose a host of problems for the serious investigator 'whose mind is free and head is held high'. Individual constitutions are characterized by *doshas* (*dosha prakriti*) which determine their response to diseases as well as to treatment. Do the *vata, pitta* and *kapha* phenotypes have pharmacogenomic equivalents? Could we then possibly take a step in demystifying *doshas*? Medicinal plants can be grouped on the basis of their primary activity as anit-*vata*, anti-*pitta* and anti-*kapha*. If these groups are screened through a battery of tests - anti inflammatory, anti mitotic, anti-oxidant etc., - would there be fingerprints to suggest a biological basis for *doshas*? *Rasayanas* are claimed to have remarkable powers to mitigate the degenerative changes of ageing. A model for measuring the rate of repair of DNA in adult and neonate rat brain cells exists and the rate in the adult is predictably slower than that of the neonate. How would the rate be modified, if at all, when the adult is pretreated with *Rasayanas*? Since *pancakarma* is claimed by patients, physicians and even tourists to have beneficial effects, could one measure the biochemical and immunological status of subjects before and after the traditional procedure? The list could go on, but neither the medical nor the scientific community have shown any serious inclination to take a plunge into the unfamiliar waters of Ayurvedic biology. Unlike *Caraka's* therapeutics which is practised enthusiastically, his hints for enquiry have had few takers. There is little doubt that the outlook in India would change if a paper from Europe or the US were to appear in a high impact journal on any of the listed or unlisted problems of Ayurveda!

Conclusion

In a memorable address in Bengali, in 1911, as the President of the Bengali Literary Conference, Bose referred to the many difficulties of doing research in India and the futility of envying the good fortune of other nations. He urged Indians to think "In whatever conditions we are placed, that is the true starting point for us. India is our working place, and all our duties are to be accomplished here, and nowhere else". India according to him, had shared her knowledge in the past with the world and could not let herself become a perpectual debtor. Through the dedication of the Bose Institute, he placed two ideals before India. "She has to become efficient in every way - through the spread of education, through performance of civic duties and responsibilities, through activities both industrial and commercial. Neglect of these essentials of national duty will imperil her very existence". But he was quick to point out that these alone would not ensure the life of the Indian nation. The complementary ideal - so revered in India - was that of giving, of self-renunciation, of enriching the world by giving away the fruits of one's victorious experience. This conviction lay behind his choice of Ashoka's *"amalaki"* on the cornices of the Bose Institute and of a symbol of thunderbolt fashioned from Sage Dadhichi's preferred bones. He believed that "the past shall be reborn in a nobler future" and "through the efforts of our lives and our unshaken faith in the future we may all help to build the greater India yet to be". For his dream to come true, we would do well, as we labour and experiment, to look for clues in the heritage of Bose and the *Acharyas* who preceded him for a journey into uncharted lands and not to be carried away by what is fashionable in science.

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(Contd.. from page no 12)

Many social and political analysts feel that the rise of fundamentalism is a reaction, response and counter-aggression to this ever intensifying process of homogenization. Macaulays, the architects of western education in colonies, get the main credit for this trend in its historical perspective. In the contemporary perspective the power and status of the western countries in international arena and their leadership in science and technology share the credit because English and western education is much sought after for the purpose of keeping abreast with expanding frontiers of knowledge and the fast changing technology.

In this backdrop one has to reflect whether borderless education is likely to further expand, deepen and speed up the process of homogenization of human beings. Diversity is fundamental to nature. Flora and Fauna exhibit infinite diversity in innumerable eco-systems of the world. The essential individuality of a human being lies in his or her own identity. Groups and communities of people can take pride in their own cultural identities. Threat to cultural identities is one of the root causes not only of fundamentalism but also a wide variety of insurgency and terrorism. The trouble spots of the world have the issue of identity and cultural freedom as one of the main springs of the grievance of the aggrieved. Ethnic problems in Srilanka, insurgency in north east of India, the continued hostility between Israel and Palestine, as also between Turkey and Greece are some of the examples.

Internationalisation of education is a matter to be left to economists, bureaucrats or politicians. Its socio-cultural implication can be ignored only at the peril to world peace, social harmony and disappearance of diversity. Choosing between, on the one hand, a homogenized world in which all human being resemble and become the product of a factory mould and on the other a world where diversity is the order just as it is order in nature, where thousands of flowers bloom, where every human being is a unique specimen, with own identity and individuality, where diverse cultures with variety of languages, beliefs, traditions, dress-code, food-habit and in every aspect of life style exist and where community bonds are strong, in short, the choice is between a world characterised by unity in diversity and a world with homogenized culture and mould-produced human beings uniform in culture, through not in physical appearance. The issue of internationalization of education has to be judged on this basis. The choice will depend upon our value system. Do we value homogenization or diversity? Do we value competition or community feeling? ❑

CAMPUS NEWS

National Seminar on Music Education

A National Seminar on Music Education in Indian Universities was organized recently under the joint sponsorship of the SNDT Women's University, Mumbai and the Indian Musicological Society. Spread over seven sessions, the Seminar discussed topical areas of interest like: Music Education - Teaching Methodologies - New Trends; UGC Model Curriculum in Music, 2001 - Salient Features and Appraisal; Music Curriculum Development; Music Education and Technology; Interdisciplinary Studies; and Research in Music. Out of the 300 and odd universities in the country (including deemed universities) about 70 teach music as a subject. The Director of the Seminar, Prof. R.C. Mehta, in his opening speech, pointed out that out of these, delegates some forty universities were participating in this Seminar.

The Seminar provided a forum for an exchange of ideas between faculty representatives from different regions of the country, from Bengal in the East (Shantiniketan) to Bhavnagar in the West, and Shimla in the North to Chennai in the South. The participants also included representatives from the media (eminent music critics) and from prominent private organizations engaged in music education. Inaugurating the Seminar, the eminent Santoor virtuoso Pandit Shivkumar Sharma set the tone for the deliberations straightaway by stressing the need for music curricula that train students not only as performers, researchers or teachers, but also as knowledgeable listeners, because performers need discerning audiences to feel enthused to give their best. He also pointed out that after the end of the era of princely patronage, it is audiences that constitute the corps of patrons in modern India.

Prof. Rupa Shah, Vice Chancellor of SNDT University who chaired the inaugural session of the Seminar, observed that in the stress-filled lifestyles of modern times, music can play a vital part in-strengthening our moorings and help restore core human values through the aesthetic dimension. There was near unanimous agreement among the participants regarding the need for taking advantage of modern technology like multimedia presentations, sound recording and analysing technology, and computer-digital storage and preservation facilities. At the same time it was also agreed that technology ('virtual classrooms' and websites, for instance) can supplement, but not supplant, the human teacher, especially in the performing arts, and that the need is to evolve a judicious combination of the advantages of the old oral tradition as well as new systems of information dissemination.

Dr. Ashok Ranade, former Head, Department of Music, Bombay University, who chaired the concluding session, on Research in Music, emphasized the need for a broader and more comprehensive perspective in music related discussions, to include not only art or classical music but also folk, primitive and fusion genres, since it is the cross-fertilization of cultural elements that help shape the evolution of the performing arts traditions. Pandit Arvind Parikh, who gave the valedictory address at the concluding session, reiterated the need for upholding time-tested values while incorporating technological advances and advocated extra care in admission of students recruitment of faculty and re-defining the objectives and goals of University Education in Music.

A set of draft recommendations was discussed and adopted at the end of the Seminar. Some of the recommendations were:

- There should be some uniformity in the syllabus followed by different universities (with provision for regional variations based on specific, area-wise needs).
- Requirement of PhD and research publications as a prerequisite for faculty promotions needs to be reviewed, since the number of published papers cannot be a relevant index for performing artistes.
- Development of short certificate courses, for sensitizing lay listeners (rather than training students in performing) is important especially for bridging the 'musical divide' by creating greater awareness of Hindustani music in the southern regions and of Carnatic system in the north. This would bring socio-cultural bonuses top, in the form of better national integration and greater communal harmony. Short elective courses could also be developed to cater to students who are not offering music as a major subject but would like to be acquainted with its basics as an additional skill.
- Inter-disciplinary studies should be promoted

(music and psychology, music and writing/ communication skills, music and management, etc)

- The earlier recommendations of model curricula should be implemented (constituting a national council for music education, and introduction of music as part of the curriculum at the school stage itself, and production of audio-video cassettes as teaching aids, for instance). Non-implementation causes disinterest and disillusionment in the teaching fraternity.
- Music education should also be job-oriented.

The Seminar concluded with a vote in favour of the idea of a National Forum for University Music Teachers, to meet at least once a year, at different venues by rotation, for a fruitful exchange of ideas and experiences.

Refresher Course in Value Based Education

Sri Sarada College of Education (Autonomous) Salem has been recognized as the Refresher Course Centre for the Periyar University, Salem. A UGC sponsored Refresher Course in 'Value Based Education and Professionalisation' was held there recently. Thirty-two Lecturers from various colleges of Salem, Dharmapuri, Krishnagiri, Rasipuram, Namakkal and Chennai attended the Course. Delivering the Inaugural Address, Dr. Kumarasamy, Joint Director of Collegiate Education, Coimbatore Region, Coimbatore traced the rich Indian tradition of Value Oriented Education. He emphasized the significance of Value Education to solve the problems of the present materialistic world and resolve the conflicts among people

Sri M. Vasudev, Regional Director, Nation Council for Teacher Education, Bangalore in his Keynote address highlighted the steps taken by the NCTE in bringing out literature on value education and its emphasis on value education in teacher preparation. He urged the participants of the course to reflect upon their important roles as models to the students. Ms. Yatiswari Ambikapriya, Secretary, Sri Sarada College of Education, commenced the Course. Yatiswari Guhapriya, Secretary, Sri Sarada College for Women and Yatiswari Vinayakapriya, Secretary, Sri Sarada College Educational Trust were present in the inaugural function.

The range of topics covered in the sessions included — Values: Concept, Significance and Conflict Resolution; Value Component in the Vedas, the Bhagavad Geetha; Values Advocated by Great Thinkers and Educators; Significance of Yoga, Meditation & Inner Peace; Need for Religious Harmony; Relevance of Gandhian Values; Value of Persevering the Environment and Biodiversity; Service to the Community; Values of Time, Health, Physical Education; Emotional Intelligence, Inter Personal Relations, Values of Professional Preparation and Ethics; Development and Analysis of Values; Drafting Value-Oriented Curricula and Syllabi; Teaching Methodology and Evaluation of Value Education. Experts in the field of Value Education and Eminent Educators from Karnataka and Tamil Nadu served as the Resource Persons.

Conforming to the latest UGC guidelines a continuous, purposeful evaluation of the participants was done. While the sessions progressed, the participants held group discussions and presented reports. Written assignments and individual project reports centering on their roles as value educators in imparting value integrated education were challenging endeavours that had helped them to focus their energies on the core theme of the Refresher Course.

During the Valedictory Address Dr. R. Ayyappan, Joint Director (Finance), Directorate of Collegiate Education, Chennai recalled the values he imbibed from his student days. He reiterated that the prime objective of attending Refresher Course would be to enhance one's professional competence and subject knowledge. He raised a clarion call that lecturers at higher education level in India have to become better than their foreign counter parts and prove so before 2005, when the liberalization and globalization would open doors to scholars of the world occupy the Indian scene. "This would be a great challenge to realize the objectives of quality and relevance of education, he said. Earlier, Dr. Mrs. M. Sumathy, Principal, Sri Sarada College of Education (Autonomous), Salem gave welcome address and Dr. R. Kasthuri Bai, Sri Sarada College for Women (Autonomous), Salem, proposed a vote of thanks.

National Seminar on K-Dimension

A National Seminar on K-Dimension is being organised by the Faculty of Education, Banasthali Vidyapith, Banasthali during February 21-23, 2004. The term 'Teacher Education' most often is taken to mean 'school teachers' education'. Several times, 'education' as an area of study is referred to as equivalent of 'teacher education'. Conceptually, however, teacher education (TE) pertains to that aspect of education which deals with preparation as well as updating of teachers of all educational programmes. In familiar terms, it includes all pre-service and in-service programmes for teachers of varied categories, not only in schools. One reason for this could be that initially school teachers were recognised as persons who deal with the children of formative age and so, need to be 'prepared' for this.

Pre-service TEP, particularly B.Ed., has been serving more than its purpose. In addition to having its main focus on preparation of secondary school teachers it is also the 'basic' degree for various levels of study of education as a discipline as well as for several jobs-school teacher, school principal, post graduate studies, in education, teacher educators, researchers in education-in short, most require 'B.Ed' as a basis. The Secondary TE Programme has been an omnibus programme. It is time to recognise similar programmes are necessary for preparing teachers for various educational programmes such as for medical teachers, technical and engineering teachers, teachers of law, nursing, management education, and of course, college and university teachers. Most of these teachers are not 'prepared' in the sense that they do not lead to formal degrees or diplomas but are made essential for respective areas of programmes of Academic Staff Colleges are examples of such. However, over years, several other Teacher Education programmes have emerged catering to different categories of teachers. Separate programmes are also developed for teachers of particular areas such as physical education, language education and technical education. Despite all these, the term Teacher Education is generally associated with school teachers, that too, with preparation of pre-service secondary school teachers. It is time to have a discourse on all the existing programmes of TE with a view to identifying certain concerns of common interest as well as those distinct to each programme, which represent the knowledge dimension (K-dimension).

What is the basic conceptual thrust in each TE programme? Has K-dimension got differentiated? How is it? What kinds of foundational and pedagogic differentiation are discernible? In what forms do these vary across TE Programmes? Are they in the nature of concepts, curricular transactions or something else" Are the differentiated K-components adequate and relevant for preparing a practitioners.In view of the differential role demands, any attempt at differentiation of K requires delineation of relevant concepts and conceptualisation with respect to the specific purposes. This process require in respect of each TE progrmme, the K components needed are to be pooled, those that are redundant could be deleted, as well as relevant additions be made. In addition, K-base in the discipline of Education is expanding. Does it mean all its concerns should be reflected in TE curriculum? The above concerns point to the need for exploring the possibility of and differentiating the 'K-dimension' in teacher education. This strengthens TE as a specialisation within the broader disciplinary context of education. The Seminar is to provide a forum for such issues to be brought under closer examination by experts, practitioners and other academicians concerned. Theme of the Seminar is 'K-dimension in Teacher Education'. The sub-themes are :

- K-in Secondary TE Programme.
- K-in other TE Programmes.
- K-generation in TE.
- K-base in TE- Suggestive alternatives.

Papers on these sub-themes may be submitted by the interested practitioners, academicians and research scholars. An abstract not exceeding 600 words and soft copy of the paper may be submitted by February 5th, 2004. Registration Fee is Rs. 300/- for participants from outside Banasthali Vidyapith. Rs. 250/- for other participants from Banasthali Vidyapith. Rs. 150/- for students and research scholars. Registration fee can be paid through a bank DD in the name of Secretary, Banasthali Vidyapith, or in cash. For further details contact the Dean, Faculty of Education, Banasthali Vidyapith, Banasthali 304022 (Rajasthan) Tel. No. : 01438 - 228430 (O), 01438-228428 (R) Fax No.: 01438 -228365.

Invitation of Papers for Journal of Distance Education

The University of Jammu, Jammu brings out a Journal called 'Journal of Distance Education' every year in the month of March. The Journal of Distance Education aims at providing a forum for exchange, between the developed and developing worlds, of ideas, innovations, research outcomes, best practices, developments in print/non-print resource materials, and information on national/regional/ international seminars/workshops/conferences in areas of open, distance, flexible, life-long learning at all levels of education. The focus is largely on, but not restricted to, planning, management, innovations, change, research and development in these fields.

It is an internationally referred, contributed and abstracted journal and is available in paper back and electronic forms. Journal of Distance Education has four sections: conceptual and research papers, cases and innovations, print and book review, conferences and events. It is guided by an international advisory board, and is edited by a group of professionals from the field. The next issue of the Journal of Distance Education is being brought out in March, 2004. The editorial team for the issue constitutes of Patron -- Prof. Amitabh Mattoo, Vice Chancellor; Chairman --- Dr Santokh Ram, Director, DDE; Publication Officer -- by Dr J S Dev, Registrar; and Editor --- Dr Romesh Verma, DDE, University of Jammu, Jammu. Interested contributors may send their research papers/articles before 10th of February 2004, on Quality Education and sub themes with the following specifications:

- Excellence in Open Distance Learning.
- Quality Assurance in Distance Education.
- TQM in Open/Distance Education.
- Best Practices for Quality Distance/Open Education.
- E-Learning for Quality Distance/Open Education.
- Emerging Methodologies for Quality

  Improvement in Distance Education.
- Quality Research in Distance Education.
- Technology and Distance Education.
- Problems in Distance Education.

The Journal prefers articles/research papers of 10 to 15 pages double spaced i.e., first copy of the type written on one side of the paper. Research article/paper written for seminar/conference must be avoided. Each article/research paper should accompany the details regarding the author's name, designation, present and past academic work, research interests in brief. Approximately 100-150 words abstract of the article/ research paper with full particulars may be submitted. References should as per the guidelines. All Correspondence concerning the contributions in the form of research papers/articles and other information regarding the Journal may be addressed to the Editor, Dr Romesh Verma, DDE, University of Jammu, Jammu (J&K State), India, E-mail: romeshv@yahoo.com. For further details please contact: Dr Romesh Verma, Editor, Journal of Distance Education, University of Jammu, Jammu, India. Ph 0191-2438481(O), 0191-2455450®, Fax 0191-2430828. E-mail : romeshv@yahoo.com.

Workshop on Drug Discovery and Development

National Institute of Pharmaceutical Education and Research (NIPER) has been established by the Government of India under the aegis of Ministry of Chemicals and Fertilizers in S.A.S. Nagar (Mohali), Punjab. The institute has been declared as an Institute of National Importance by an act of Parliament. NIPER is an institution which is catering to excellence in education and research in pharmaceutical sciences. The objectives of the institute are:

- Nurturing and promoting quality and excellence in pharmaceutical education and research.
- A nucleus for academic-industry interaction by encouraging exchange of scientific and technical staff between the institute and the industry and by undertaking sponsored and funded research as well as consultancy projects by the distinguished faculty and researchers of the institute.
- Running continuing education programmes for teachers, pharmaceutical technologists, community and hospital pharmacists, and other pharmacy professionals.
- Arranging courses for the special need of developing countries.
- Creation of National Centres to cater to the needs of the pharmaceutical industry and other research and teaching institutes.
- National/International collaborative research.
- Curriculum and media development.
- Study of sociological aspects of drug use and abuse and rural pharmacy, etc.
- Running programmes in drug surveillance, community pharmacy, traditional medicines and pharmaceutical management.

The institute is conceived to provide leadership in pharmaceutical sciences and related aspects not only within India, but also to the countries in South East Asia, West Asia and Africa. Drug discovery and development is presently undergoing a paradigm shift. The new paradigm which is based on target identification and validation, robust assay systems and chemical and biological informatics has provided powerful momentum to drug discovery and development. Critical decision making related to therapeutic targets, lead generation and optimization and biological screening strategies to clinical trials, is the prime factor for successful drug discovery. Integration of such knowledge is the order of the day to achieve enhanced productivity. Pharmaceutical companies which are striving to curtail the cost of drug discovery program are adapting newer technologies and platforms. It is becoming clearer that considerable amount of money is lost on compounds that fail late in the process because of their pharmacokinetic properties and toxicity. Hence the toxicological screening should be performed at an earlier stage and problem compounds should be dropped in the beginning of discovery and developments. Keeping this in view, a four-day Workshop is being organized by the Department of Pharmacology and Toxicology, NIPER during February 26-29, 2004. It is being organized to provide students, researchers, managers and regulatory authorities an insight into the ways of in-depth understanding of the different aspects of drug discovery and development. Workshop will have lectures as well as demonstrations. The Lectures include:

- Changing trends in drug discovery
- Drug discovery research in India: opportunities and challenges
- Newer platform technologies
- Role of genomics in drug discovery
- Molecular docking
- Testing of potential compounds in in vitro models such as insulin resistance.
- Testing of potential compounds in animal models such as stroke.
- G Protein coupled receptors and drug discovery
- Safety pharmacology
- Treatment of ischemic heart disease.
- Drug developmentfor cataract.
- Oxidative stress in neurological disorders.
- Receptor binding
- Electrophysiology
- Regulatory toxicology
- Clinical trials and GCP
- Ethical issues

The Demonstrations include:

- Molecular Modeling
- Receptor binding technique
- Blood flow measurement using laser doppler blood flow monitor
- Stroke research setup.
- Molecular biology techniques
- Genotoxicity studies
- Pharmacologists and toxicologists working in R & D laboratories
- Professionals in pharmaceutical companies
- Govt. and University Pharmacy professionals
- Scientists in National laboratories
- Personnel from regulatory authorities and quality control laboratories
- Students from pharmacy profession.

The registration fee is Rs.1500/- for students, Rs. 3000/- for Government academic and Scientists and Rs. 6000/- for Industry participants. Payment may be made in the form of demand draft in the name of Director, NIPER and payable at Chandigarh or Mohali. For further details contact Dr P. Rama Rao, Workshop Convener pramarao@niper.ac.in ramaraop@yahoo.com or Dr. S.S. Sharma Workshop Co-ordinator sssharma@niper.ac.in shyamsharm 14@yahoo.com, Department of Pharmacology and Toxicology National Institute of Pharmaceutical Education and Research (NIPER) Sector 67, S.A.S. Nagar -160 062, Punjab, India. Phone : +91-172-(2214682-2214687) Fax : +91-172-2214692 Internet: http://niper.ac.in

Courses on Orchids and Eco-tourism

Under the extension services, the Community College Cell of St. Xavier's College is organising two Short Term Courses on 'Cultivation of Orchids and Anthuriums' and 'Ecotourism'. Anthuriums and Orchids have a very good market potential in Goa. Both these flowers have a longer table life and have an outstanding exotic appearance. The table life of these flowers is 15-20 days. They remain fresh on the plant for not less than a month. As Orchids and Anthuriums are commercially viable and require easier daily handling, makes it an ideal choice as a career opportunity or a profitable hobby in Goa. In addition, the Goan climate is highly suitable for these plants.

The Eco-tourism Course is mainly for tourist guides and others who are interested. A large number of tourists are interested in Eco-tourism. With the International Film Festival in the offing, many visitors would require the help of specialized guides. The Course will also include field trips. Besides the work skills, the Course will also involve coping skills, such as communication skills, personality development, etc. The Courses will commence on 14th February, 2004, and the last date for submitting applications is 2nd February, 2004. For further details contact 2262356 or email at xaviercollege@sancharnet.in.

We Congratulate......

Prof. Swapan Kumar Pramanick, who has taken over as the Vice Chancellor of Vidyasagar University, Midnapore.

Prof. M C Gupta, who has taken over as the Vice Chancellor of Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal.

Dr. S N Mahendra, who has taken over as the Director of National Institute of Technology, Kurukshetra.

News from Agricultural Universities

Workshop on Medicinal Plants

The Vigyan Bharati and Indian Veterinary Research Institute, Izatnagar jointly organised a 'Workshop and Exhibition on Panchgavya evam Medicinal Plants: Treasure-Importance and Research possibilities' recently. It was inaugurated by Hon'ble Union Minister of State for Agriculture, Shri Hukumdeo Narayan Yadav'. In his inaugural address, Shri Yadav talked about the distinctive features of European and Indian Agricultural Systems. While the former gives emphasis on productivity and quality, the later also gives importance to purity. He called upon the scientists to evaluate Indian history, culture and religion on scientific pattern to get them recognised at the world level.

Shri Hukumdeo Narayan Yadav emphasized that India does not require alternative systems but needs proper development of the existing traditional knowledge employing modern science techniques. He remarked that it is high time when we once again embark on giving respect to the farm and livestock work. He underlined the need to rediscover and utilize Panchgavya products to the maximum for protecting soil, human, animal and plant health. He brought to the notice of the scientific community that the Panchgavya products were enormously important in the ancient period.

Shri Om Prakash, a renowned social worker, informed in detail, regarding the researches being carried out on the useful properties of cow dung and urine. He exorted that 'Gobar Gas* has vital applications in rural India and agriculture as a source of energy and fuel. Shri Radhey Shyam Gupta, President, Uttar Pradesh Gau Seva Ayog explained in detail how man is responsible for most of the present day problems of environmental pollution. Human beings have over utilised natural resources without thinking of its repurcussions. He believed that products of Panchgavya will be immensly helpful in restoring some of the imbalances.

Dr. M.P. Yadav, Director, IVRI, told that besides cow milk and Panchgavya, milk of other animals has special characteristics and good for health. He informed that camel milk has been shown to be useful in Tuberculosis disease in human. He suggested to utilize excreta of human beings, animal dung and urine as natural manure. Keeping in view the livestock population and its biodiversity in India, our economy ought to be based on livestock and agriculture.

On the occasion, Dr. Yogesh Mishra, Principal, Ayurvedic College, Bareilly explained the principles and importance of Ayurvedic system of medicine. Dr. Harmesh Singh Chauhan from CMAP, Lucknow briefed about the history of Vigyan Bharati. An exhibition of Medicinal Plants was organised by World Ayurveda Council, Bareilly. The importance of medicinal plants was explained to the visitors. Shri Rajvir Singh, former Member of Parliament, Smt. Sumanlata Singh, former, MLA, Joint Directors, Heads of Divisions, Scientists of IVRI, were the other prominent invited guests. Medicinal plants were planted by Shri Hukumdeo Narayan Yadav, Hon'ble Union Minister of State for Agriculture and other dignitaties.

News from Abroad

Greek Foreigners' Fellowships Programme

The Alexander S. Onassis Foundation of Greece has announced Tenth Foreigners' Fellowship Programme of research grants and educational scholarships for the Academic year October 1, 2004 - September 30, 2005. It is addressed to non-Greeks who are full members of National Academies, University Professors of all levels (Ph.D holders), postdoctoral researchers (Ph. D holders), artists, translators of Greek literature, elementary and secondary school teachers of the Greek language as a foreign one, post-graduate students and Ph.D. candidates. The Scholarships are offered in the following fields:

- Humanitarian Studies: Literature, Translation, Linguistics, Theology, History, Archeology, Philosophy, Educational Studies, Psychology.
- Political Science: Sociology, Anthropology, Public Administration, International Relations, Mass Media.
- Law.
- Economics.
- Architecture.
- Arts: Visual Arts, Music, Dance, Theatre, Photography, Film Studies.

The candidates who are interested in applying for any of the above mentioned scholarships may submit their application forms to the Onassis Foundation latest by 31 January, 2004. For further details contact Foundation's Secretariat, Alexander S. Onassis Public Benefit Foundation, Foreigners' Fellowships Programme, 7, Aeschinou Street, 105 58 Athens, Greece. Website: www. Onassis.gr. E-mail: foreigners@onassis.gr.

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4. **SELECTION**

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DIRECTOR-IN-CHARGE

COMMUNICATION

Higher Education Development in the North Eastern States : Towards an Action Plan

North Eastern states deserve to be regarded not as an isolated topographical entity with backwardness as its economic hallmark any more. No doubt, because of enormous difficulties and obstacles in communication with the capital of the country on account of geographical distance and other factors the seven states of the North East - now eight including Sikim - have lagged behind in economic development so far. As a consequence, the growth and development in the North Eastern states from all points of view has been sluggish. But after fifty-six years of Independence, India cannot afford to allow any part of the country to be weak in any aspect. Hence, the North East with its vast geographical body cannot be allowed to remain stagnant or even sluggish in development. The central key to development lies in the educational development of the area. Therefore, the higher education development in the North East at present and in immediate future is of paramount importance and significance in the context not only of the North East but also of the entire country.

However, it should be borne in mind that the North Eastern states are not to be represented only by their capital towns like Guwahati, Shillong, Agartala, Imphal, Kohima, Itanagar, Aizawl and Gangtok. The capitals with their modern amenities do not reflect the actual living conditions in various parts of the states. North Eastern states have vast remote areas. People do live there. Who will think about the development of these people? Sophisticated elites living in the capitals do not represent the grassroot reality in the North Eastern states. Higher education must reach people in the remote areas. We, the educational planners, must take this phenomena into account while we envisage the total development of the state of higher education in the country. The challenges of disseminating higher education in the North Eastern states are enormous and, therefore, require special consideration and focus.

As the terrain in the North East is difficult, craggy, undulating and inaccessible in many areas, subject to frequent natural calamities like floods and earthquakes, the mode of dissemination of knowledge at the higher education level in the North Eastern states has to be re-examined in order to make it more effective. Distance mode of education and teleconferencing are absolutely essential for the dissemination of knowledge in the remote areas. Setting up of institutes of higher education in various urban locations is no doubt important, but they should not concentrate on catering to the needs of the urban population only. The institutes of higher education that already exist in the North East should be strengthened and empowered by the central and state governments in all respects so that they can perform the difficult role of spreading knowledge to the people of the remote areas. Therefore, the financial investment and logistic support for the promotion of knowledge and education in the North East through the institutes of higher education of the area should be provided by both the central and state governments in a large measure. The investment should be on the higher side because the backward North Eastern states have to be brought to a level of attainment at par with the rest of the country.

Now that the remoteness, difficulty in terrain, natural calamities and backwardness as factors for consideration have been emphasised in the context of the higher education development in the North East, special measures should be taken to tackle the same. Each university in the North East should have Distance Education Cell in order to provide education to the dropouts and other members of the society who cannot get admission in regular courses in the universities for various reasons. Nobody in the jurisdiction of a university should be denied access to higher education if he or she has the minimum competence to pursue it. However, since the North East is remote and economically backward, universities should be empowered to provide skill-based education to those who do not have the competence to pursue research-based education. Hence, distance mode of education is not the only solution. Vocationalisation of higher education is also to be provided in order to enable and empower the students who do not have the knack and inclination for research.

Before I take up the other factors for consideration, let me emphasise right at the beginning that bureaucratic stringencies should not slow down the process and tempo of action that has to be taken in every front. Often rules stand in the way of rapid progress in the field of higher education. North East has several peculiarities and difficulties; they should be considered while central government agencies impose central rules to be followed. Since the economic standard and logistic support are largely inadequate, and adequate number of trained personnel is not available in the North East, special provisions should be made so that the higher education institutes can run the programmes smoothly as the grassroot situation in the North East is quite different from that in the rest of the country. Since privatisation of higher education has become unavoidable in the present context, as the Government cannot bear the entire financial burden for running the higher education machinery, the special situation in the North East has to be considered, and rules have to be framed on the basis of existing reality so that the private institutes in the North East with less financial capacity than in the rest of the country may be encouraged to fill the gaps whenever government institutes cannot reach the large mass of aspirants for higher education.

Hence, the speciality and peculiarity of the higher education situation in the North East has to be taken into account in every respect for developing the proper strategy for the spread and dissemination of higher education in the states. In addition to developing the logistic support, the liberalisation of bureaucratic rules, the facilities for non-conventional modes of teaching, namely, through distance education and teleconferencing, the special facilities for the study of local biodiversity, tribal and ethnic culture, forest produce, tea and timber should be developed. For that purpose, adequate financial investment and training of required personnel should be provided. The special richness of the area has to be highlighted for projecting the North Eastern states as a special area of study both within the country and abroad.

Therefore, the action plan for the development of higher education in the North Eastern states has to stress upon the need to overcome the communication difficulties, upgrading of the infrastructural facilities, developing the means of reaching the people in the remote areas, training of personnel for higher education and liberalisation of government rules at present. The action plan has to develop a vision and strategy for projecting the special richness of the North Eastern states like biodiversity, natural environment, tribal and ethnic cultures, and the local agricultural products as an important area of study both within the country as well as abroad. International collaborations will also develop as a consequence. In these days of globalisation, North Eastern states should no longer remain remote and withdrawn. With proper and adequate investment, planned strategies for development, we are sure that the North Eastern states will be able to reach the national standard in the field of higher education, and in certain specific areas, they may even excel the rest of the country. No doubt, there is a tremendous prospect, but the prospect has to be actualized through a properly organised action plan.

Subhas Chandra Saha
Vice Chancellor
Assam University, Silchar ❑

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THESES OF THE MONTH

A list of doctoral theses accepted by Indian Universities (Notifications received in AIU during November-December, 2003)

AGRICULTURAL & VETERINARY SCIENCES

Agricultural Engineering

1. Bhosale, Rajendra Narayan. **Studies on effect of various process parameters on quality of plantation white sugar.** (Dr Jenekar G M), Department of Sugar Technology, Swami Ramanand Teerth Marathwada University, Nanded.

2. Londhe, Machindra Bhaurao. **Studies on scientific evaluation of various parameters responsible for mud settling in cane juice clarification by liming and sulphitation method in plantation white sugar manufacture.** (Dr Jenekar G M), Department of Sugar Technology, Swami Ramanand Teerth Marathwada University, Nanded

Agronomy

1. Patke, Nitin Kashiram. **Crop weather relationship in wheat.** (Dr S M Patil), Department of Agronomy, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola

Entomology

1. Bhaskar, Jyoti. **Population dynamics of whiteflies on vegetable crops and evaluation of some insecticides for their control.** (Dr J R Thakur), Department of Entomology, *Dr Yashwant Singh Parmar University of* Horticulture and Forestry, Solan

Plant Breeding

1. Aditya Pratap. **Relative efficiency of anther culture and wide hyberdisation for applied in action in triticale and triticale wheat hybrids.** (Dr G S Sethi), Department of Plant Breeding, Ch Sarwan Kumar Himachal Pradesh Krishi Vishwavidyalaya, Palampur

2. Sharma, Vikas Kumar. **Studies on selection and variability in Hazelnut in Himachal Pradesh.** (Dr S D Sharma), Department of Fruit Breeding and Genetic Resources, Dr Yashwant Singh Parmar University of *Horticulture* and Forestry, Solan.

Pomology

1. Joshi, Prashant Suresh. **Effect of growing media, bioregulators and nutrients on growth, yield and quality of strawberry cv. *Chandler*.** (Dr K K Jindal), Department of Pomology, Dr Yashwant Singh Parmar University of Horticulture and Forestry, Solan

Soil Science

1. Bhardwaj, Ajay Kumar. **Studies on productivity of harvested rain water in okra-cabbage-potato crop sequence through irrigation scheduling and organic manuring.** (Dr K K Katoch), Department of Soil Sciences, Ch Sarwan Kumar *Himachal* Pradesh Krishi Vishwavidyalaya, Palampur.

2. Verma, Jagat Ram. **Soil resource mapping and land use planning of Parmar University Campus Farm, Solan, Himachal Pradesh.** (Dr Karan Singh), Department of Soil Science and Water Management, Dr Yashwant Singh Parmar *University of Horticulture and Forestry, Solan.*

Vegetable Science

1. Parmar, Aligurt Manu. **Characterisation of melon germplasm using SDS page of seed proteins.** Department of Vegetable Crops, Punjab Agricultural University, Ludhiana.

BIOLOGICAL SCIENCES

Biotechnology

1. Ramneet Kaur. **Molecular characterisation of P4 gene of haemophilus influenzae (Indian strain).** Department of Biotechnology, Post Graduate Institute of Medical Education and Research, Chandigarh.

Botany

1. Bora, Ranjan Kumar. **Effect of plant growth regulators on growth and protein content of certain legumes.** (Dr C M Sarma), Department of Botany, Gauhati University, Guwahati.

2. Catherine, Pitta Gladys Anne. **Macro propagation and phytochemical studies on some species of the genus ficus Linn.** (Prof V Manga), Department of Botany, Andhra University, Waltair.

3. Chauhan, K Singh. **Studies on the chemical contaminants of cosmetics in the environment and its effect on human being.** (Dr Rekha Bhadauria), Department of Botany, Jiwaji University, Gwalior

4. Deepika Devi. **Eco-physiological studies on germination, growth, metabolism and yield of sunflower.** (Dr C M Sarma), Department of Botany, Gauhati University, Guwahati.

5. Gangwar, Anita. **Morphogenetic studies and *in vitro* secondary metabolite production in panax species.** (Prof N K Mehrotra), Department of Botany, University of Lucknow, Lucknow

6. Kamaljit Kaur. **Isolation and characterisation of antimutagenic compounds in some medicinal plants.** Department of Botany, Guru Nanak Dev Univrsity, Amritsar.

7. Khot, Sudhakar Sambhaji. **Ecophysiological studies on some halophytes occuring in and around Marine National Park of India.** (Dr A J Joshi), Department of Botany, Bhavnagar University, Bhavnagar.

8. Mahindra Kour. **Studies on the effect of some phenolic compounds and gibberellic acid on growth, yield and biochemical parameters of certain varieties of soyabean (*Glycine max.L.*).** (Dr Aparna Buzarbarua), Department of Botany, Gauhati University, Guwahati.

9. Majumdar, Sunil Kumar. **Some aspects of the biology, ecology and control of major insect-pests of coconut palm in *Tripura*.** (Prof Y D Pande), Department of Botany, Tripura University, Agartala.

10. Padmavathi, J. **A study of morphology, host specificity and genetic structure through DNA, fingerprinting of the insect pathogenic asexual fungal species beauveria bassiana (Bals.) vulliemin: A potential biopesticide.** (Prof K Umadevi), Department of Botany, Andhra University, Waltair.

11. Patole, Santosh N. **Studies on biodiversity of Pachmarhi Forest, MP with special reference to threatened and rare plants.** (Prof Ashok K Jain), Department of Botany, Jiwaji University, Gwalior.

12. Ranganath, B K. **Phytodiversity characterisation at landscape level using satelite remote sensing and GIS in Chikmagalur District, Karnataka.** (Dr Nijalaingappa B H M), Department of Botany, Bangalore University, Bangalore.

13. Shukla, Ranu. **Assessment of in vitro morphogenic response and induced variability in mungbean (*Vigna radiata* (L.) Wilczek).** (Prof R R Singh), Department of Botany, University of Lucknow, Lucknow.

14. Singh, Shraddha. **Studies on effects induced in the plants (Brassica Juncaea, Vigna Radiata and Helianthus Annus) ground on tannery waste amended soil implication for phytoremediation.** (Prof H N Verma), Department of Botany, University of Lucknow, Lucknow.

15. Singh, Survesh Kumar. **Calcareous algae from the palaeogene successions of Kachchh, Gujarat, Western India.** (Prof P K Mishra), Department of Botany, University of Lucknow, Lucknow.

16. Sreevalli, Y. **Inheritance of some morphological, floral, reproductive and economically important traits in the medicinal plant, Periwinkle (Catharanthus roseus(L). G. Don).** (Dr R N Kulkarni), Department of Botany, Bangalore University, Bangalore.

17. Syeda Jahanara Begum. **Studies on certain aspects of bacteriological quality of water in rural and urban areas of Kamrup District, Assam.** (Dr K N Bora), Department of Botany, Gauhati University, Guwahati.

Life Science

1. Bhattacharjee, Goutam. **Earth worm resources and waste management through vermicomposting in Tripura.** (Dr Priyasankar Choudhuri), Department of Life Science, Tripura University, Agartala.

2. Manvender Singh. **Ecological genetics of qualitative traits in drosophilea.** (Prof Ravi Parkash), Department of Life Science, Maharshi Dayanand University, Rohtak.

3. Sahu, Meenakshi. ***Studies on the physico-chemical*** **characterstic of industrial effluents: Their effect on soil physico-chemical properties and on crop and vegetable plants.** (Dr J P Yadav), Department of Life Science, Maharshi Dayanand University, Rohtak.

4. Suman Lata. **Analysis of fluoride levels in drinking water sources and incidence of fluorosis in rural areas of Distt Jhajjar, Haryana.** (Dr J P Yadav), Department of Life Science, Maharshi Dayanand University, Rohtak.

Microbiology

1. Silawat, Nipun. **Studies on genetics biodiversity among *indigenous yeast*.** (Dr S P Gautam and Dr R C Rajak), Department of Microbiology, Rani Durgavati Vishwavidyalaya, Jabalpur.

Zoology

1. Anuradha Kumari. **A *comparative account of the* development of air breathing organ in two genera of estuarine gobies.** (Dr A N Yadav), Department of Zoology, Babasaheb Bhimrao Ambedkar Bihar University, Muzaffarpur.

2. Das, Purnima. **A study on diversity of ichthyofauna, *assessment of ecological impact on the reproductive* behaviour of the genus garra (Hamilton-Buchanan) in the Basistha River of Assam, India.** (Dr S C Bordoloi and Dr A Dutta), Department of Zoology, Gauhati University, Guwahati.

3. Deshmukh, Jayshree Uttamrao. **Godavari River water pollution with respect to MIDC Area, Nanded.** (Dr N E Ambhore), Department of Zoology, Swami Ramanand Teerth Marathwada University, Nanded.

4. Gupta, Samidha. **Clinical biochemical parasitological studies and prevalence of caprine schistosomiasis in and around Jabalpur.** (Dr Asha Khanna and Dr M C Agrawal), Department of Zoology, Rani Durgavati Vishwavidyalaya, Jabalpur.

5. Kale, Mahadeo Kisanrao. **Studies on the cestode parasites of vertebrates from Beed District, Maharashtra State, India.** (Dr G B Shinde), Department of Zoology, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

6. Shinde, Ashwin Ramrao. **Studies on the cestode parasites of vertebrates from Latur District, Maharashtra State.** (Dr G B Shinde), Department of Zoology, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

7. Singha, Prem Kishan. **Cost effectiveness of fishing gears used in the beel fisheries of Assam.** (Dr M M Goswami and Dr M Kakati), Department of Zoology, Gauhati University, Guwahati.

8. Suryawanshi, Nilkanth Venkatrao. **Bio-systematic studies on cestode parasites of vertebrates from Omerga and Basya Kalyan Area.** (Dr B V Jadhav), Department of Zoology, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

9. Thriveni, C E. **Acid and alkaline phosphatase *isozyme studies in different varieties of Eri silkworm* philosamia ricini.** (Dr Revanasiddaiah H M), Department of Zoology, Bangalore University, Bangalore.

EARTH SYSTEM SCIENCES

Environmental Science

1. Ghanbahadur, Girish Ramkishan. **Toxicity evaluation of pesticides and pollution.** (Dr S B Wagh), Department of Environmental Science, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

2. Kiran Kumari, P. **A study of floral phathology, floral biology and floral calendar of honeybees in Visakhapatnam, Andhra Pradesh.** (Prof P S Raja Sekhar and Dr A J Solomon Raju), Department of Environmental Sciences, Andhra University, Waltair.

3. Pati, Sharada Shrinivas. **Bioremediation of fly ash pollution for agricultural use through earthworm activity.** (Dr S K Sahu), Department of Environmental Science, Sambalpur University, Jyoti Vihar, Burla.

4. Talukdar, Birendra. **A study of the characterisation of effluent and determination of heavy metals in *surrounding water course of Nagaon Paper Mill.*** (Dr K P Sarma and Dr S K Sarma), Department of Environmental Science, Gauhati University, Guwahati.

Geology

1. Rajiv Kumar. **Structual studies and deformation mechanism in the main central thrust *zone of the* Guptkashi Gaurikund Area Garhwal Himalaya.** (Prof A R Bhattacharya), Department of Geology, University of Lucknow, Lucknow.

2. Shashi Bhushan Kumar, H V. **Hydrogeological study of Hirchalla watershed using remote sensing and GIS Techniques.** (Dr Renuka Prasad T J), Department of Geology, Bangalore University, Bangalore.

3. Singha, L Joy Chandra. **Sedimentological studies of the barail sandstones occurring in and around Sonapur, Jaintia Hills District, Meghalaya.** (Dr P K Das), Department of Geological Science, Gauhati University, Guwahati.

ENGINEERING SCIENCES

Civil Engineering

1. Bora, Atul. **Characterisation of fly ash of Salakati Thermal Power plant for geotechnical applications.** (Dr M M Das, Dr M Ahmed and Dr U C Kalita), Department of Civil Engineering, Gauhati University, Guwahati

2. Udhayakumar, C. **Satellite image processing using *artificial neural network* and conventional algorithms.** (Dr K M Mehata), Department of Civil Engineering, Anna University, Chennai

3. Vidhya, R. **Object based image analysis for remote sensing data.** (Dr M Kaarmegam), Department of Civil Engineering, Anna University, Chennai

Computer Science

1. Hardeep Singh. **Modelling and design of software metrics for object oriented system.** Department of Computer Science, Guru Nanak Dev University, Amritsar.

Mechanical Engineering

1. Arumugham, V. **Particulate emission control using bimetal coated *ceramic filters in DI diesel engine.*** (Dr K Balagurunathan), Department of Mechanical Engineering, Anna University, Chennai

2. Gupta, Mohan. **Study of effective areas of steel angles under tension.** (Dr I M Gupta), Department of Applied Mechanics, Visvesvaraya National Institute of Technology, Nagpur

3. Maharathi, Binod Bihari. **Study on dynamics of rotor bearing systems and optimisation of rotor bearing *parameters for minimum rotor unbalance response.*** (Dr A K Behera), Department of Mechanical Engineering, Sambalpur University, Jyoti Vihar, Burla

4. Muthu, V. **Studies on vapour absorption refrigeration systems using R134a-DMAC as working fluid with low potential heat sources.** (Dr S Renganarayanan), Department of Mechanical Engineering, Anna University, Chennai

5. Parhi, Dayal Ramakrushna. **Dynamic behaviour of beam/rotor structures with transverse crack subjected to external force.** (Dr A K Behera), Department of Mechanical Engineering, Sambalpur University, Jyoti Vihar, Burla.

6. Stephen, I S. **Manufacturing effectiveness and process improvement model (MEPIM) for reengineering using integrated management system.** (Dr R Radhakrishnan), Department of Mechanical Engineering, Anna University, Chennai.

7. Venkata, V S K. ***Studies on grind hardening effect* in cylindrical grinding.** (Dr B Rajmohan), Department of Mechanical Engineering, Anna University, Chennai.

MATHEMATICAL SCIENCES

Mathematics

1. Amrik Singh. **Probabilistic and non-probabilistic information measures and their applications to coding theory.** Department of Mathematics, Guru Nanak Dev University, Amritsar.

2. Mohd Ahmed. **A study of bilateral mock theta functions.** (Dr D P Shukla), Department of Mathematics, University of Lucknow, Lucknow.

3. Pal, Arun Kumar. **Studies of fluid film lubrication *with emphasis on thermal effects and fluids with* suspension.** (Dr Rita Choudhury and Dr N C Das), Department of Mathematics, Gauhati University, Guwahati.

4. Rajendra Prasad. **A study of trans-sasakian manifolds and its submanifolds.** (Dr M M Tripathi), Department of Mathematics, University of Lucknow, Lucknow.

5. Rampal, Meenu. **Some results on approximation *and fixed points in metric linear spaces and metric spaces.*** Department of Mathematics, Guru Nanak Dev University, Amritsar.

6. Srinivasa Rao, Ch. **Some contributions to the mixed point theory of F-complete topological spaces, complete metric spaces, compact mytric spaces and convex metric spaces.** (Prof K P R Sastry), Department of Mathematics, Andhra University, Waltair.

7. Srivastava, Neetu. **Flow and heat transfer of a viscous fluid through forous media.** (Prof A C Srivastava), Department of Mathematics, University of Lucknow, Lucknow.

Statistics

1. Jaya Sree, G. ***Derived power series distributions* and applications.** (Prof R J Ramalingaswamy), Department of Statistics, Osmania University, Hyderabad.

2. Mathew, R John. **Some parishable inventory models with constant rate of replenishment.** (Prof J Lakshminarayana), Department of Statistics, Andhra University, Waltair.

MEDICAL SCIENCES

Genetics

1. Inderjeet Kaur. **DNA markers in four endogamous groups of Punjab.** Department of Genetics, Guru Nanak Dev University, Amritsar.

Immunology

1. Nirbhai Singh. ***Identification of recombinant* antigens of leishmania dondvani having T-Cell *proliferative potential in visceral leishamaniasis.*** Department of Immunology, Post Graduate Institute of Medical Education and Research, Chandigarh.

Pharmaceutical Science

1. Patel, Chhaganbhai Nanjibhai. **Determination of antihypertensive agents by acid-dye method in their pure powder, dosage forms and biological fluid.** (Dr B N Suhagia), Department of Pharmaceutical Chemistry, Hemchandracharya North Gujarat Unviersity, Patan.

2. Preet Mohinder Singh. **Synthesis and evaluation of some 1,3-Diazabuta-1,3-dienes as potential antimicrobial agents.** Department of Pharmaceutical Science, Guru Nanak Dev University, Amritsar.

3. Rajinder Singh. **Investigations on photochemical and thermal transformations of some carbonyl compounds.** Department of Pharmaceutical Science, Guru Nanak Dev University, Amritsar.

4. Verma, V Hari Kumar. **Phytochemical studies of some medicinal and aromatic plants: Ajuga bracteosa Linn., Tagetes minuta Linn., Bauhinia variegata Linn. and *Bothyiochloa bladhii Kuntze.*** *Department of* Pharmaceutical Science, Guru Nanak Dev University, Amritsar

PHYSICAL SCIENCES

Biochemistry

1. Das, Amitava. **Molecular and pharmacological characterisation of *acetylcholinesterase in learning and* memory functions.** (Prof P C Mishra), Department of Biochemistry, University of Lucknow, Lucknow.

2. Kamble, Laxmikant Haribhau. **Digestive enzymes of *spodoptera litura.*** (Dr S S Pawar), Department of Biochemistry, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

3. Navjot Kaur. **Studies on some phytolectins: Purification and characterization.** Department of Biochemistry, Guru Nanak Dev University, Amritsar.

Chemistry

1. Amita. **Theoretical studies on the S-N interactions in organosulfur compounds.** Department of Chemistry, Guru Nanak Dev University, Amritsar.

2. Bhattacharya, Abhijit. **Chemical investigation of Diospyros Nigra and some other related medicinal plants of Tripura.** (Dr B Dinda), Department of Chemistry, Tripura University, Agartala.

3. Chudasama, Chintansinh Dharmendrasinh. **Studies on the absorption of N2, O2 and Ar in microporous solids.** (Dr R V Jasra), Department of Chemistry, Bhavnagar University, Bhavnagar.

4. Jethva, Ashok Kumar Dahyabhai. **Synthesis, structural studies of some halogen containing organic compounds with special reference to compounds containing fluorine.** (Dr S N Misra and Dr P K Ghosh), Department of Chemistry, Bhavnagar University, Bhavnagar.

5. Kamble, Vinod Tribhuvannathji. **Polymer supported and inorganic reagents in organic synthesis.** (Dr B P *Bandgar), Department of Chemistry. Swami Ramanand Teerth* Marathwada University, Nanded.

6. Kayande, Deepak Dinkarrao. **Study of mixed ligand complex systems such as-transition metal-aminoacid-urea/ substituted urea.** (Dr D G Dhuley), Department of Chemistry, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

7. Khan, Mohib Abdul Jalil. **Chemotaxonomical significance of anthraquinone glycosides in local cassia species.** (Dr M S Shingare), Department of Chemistry, Dr Babasaheb Ambedkar Marathwada University, Aurangabad.

8. Mallikarjuna Rao, G P V. **New analytical methods for the determination of selected drugs.** (Prof M Krishna Prasad), Department of Chemistry, Andhra University, Waltair.

9. Maurya, Archana. **A study *of masson's slope in* different solvent mixture of low and high dielectric constant from apparent molar volume data using magnetic float desitometer.** (Prof R N Pathak), Department of Chemistry, University of Lucknow, Lucknow.

10. Moudgil, Rajnish. **Theoretical studies on the electron delocalisation in some compounds of silicon and *selenium.*** Department of Chemistry, Guru Nanak Dev University, Amritsar.

11. Pant, Neerja. ***Chemical investigation of Indian* medicinal plants for bio active constituents.** (Prof A Khare), Department of Chemistry, University of Lucknow, Lucknow.

12. Sarbjit Singh. **Synthesis and technical evaluation of novel heterocylic and benzenoid mono azo disperse dyes.** Department of Chemistry, Guru Nanak Dev University, Amritsar.

13. Saxena, Shailendra Kumar. **Synthesis of bio active compounds involving proton and lewis acid mediated processes.** (Prof V K Pandey), Department of Chemistry, University of Lucknow, Lucknow.

14. Sharma, Jyotindra Sarstiram. **Quantitative spectral intensity analysis of some structurally related complexes *of Paramagnetic Lanthanide (III) ions involving 4F- 4F* transition in solution at different H+ ion concentrations.** (Dr S N Misra), Department of Chemistry, Bhavnagar University, Bhavnagar.

15. Shukla, Maya. **Metal ion catalysis in the oxidation of some thiol acids.** (Dr K K Mishra), Department of Chemistry, Rani Durgavati Vishwavidyalaya, Jabalpur.

16. Tiwari, Atul. **Investigations on synthesis characterisation and evaluation of siloxane incorporated polyimide.** (Prof S K Nema), Department of Macromolecular Science, Rani Durgavati Vishwavidyalaya, Jabalpur.

17. Tiwari, Devendra Nath. **Studies on amido-alkylation/amino alkylation reactions.** (Prof V K Pandey), *Department of Chemistry, University of Lucknow, Lucknow.*

18. Zala, Raksha Vikramsinh. **The studies of mixed *ligand complexes of transitionmetals.*** *(Dr S B Mehta).* Department of Chemistry, Bhavnagar University, Bhavnagar.

Physics

1. Arora, Narinder. **Transport studies on polymer GEL *electrolytes containing lithium salts and carboxylic acids.*** Department of Physics, Guru Nanak Dev University, Amritsar.

2. Harinder Pal Singh. ***Studies on proton conducting* polymer electrolytes based on Hydroxybenzoic acids and simple aliphatic dicarboxylic acids.** Department of Physics, Guru Nanak Dev University, Amritsar.

3. Kahol, Manoj Kumar. **Ion transport studies of mixed metal fluoride solid solutions and polyethylene oxide complexed fluorides.** Department of Physics, Guru Nanak Dev University, Amritsar.

4. Nagabhushana, H. **Thermostimulated luminescene studies of Aluminium silicate polymorphs.** (Dr B N Lakshminarasappa), Department of Physics, Bangalore University, Bangalore.

5. Thiruvadigal, D John. **Validity of constrained methods *in the solution of higher order inverse vibrational problems* in molecular systems.** (Dr S Gnanasekaran), Department of Physics, Anna University, Chennai.

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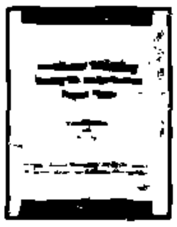

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NATIONAL INSTITUTE FOR THE MENTALLY HANDICAPPED

(Ministry of Social Justice & Empowerment, Govt. of India)
Manovikas Nagar, Secunderabad 500 009

EMPLOYMENT NOTICE

National Institute for the Mentally Handicapped was established at Secunderabad (A.P.) as an autonomous organization in the Ministry of Social Justice and Empowerment. The objectives of this Institute include development of models of care and rehabilitation, Human Resource Development, Research and Development, Consultancy services to voluntary organizations, Documentation and dissemination and Extension and Outreach programmes. NIMH is equal opportunity and gender-just employer. The faculty positions of the rank of Lecturer and above are required to contribute effectively their professional expertise in realising the objectives as aforesaid and work deligently towards development of the Institute.

Applications from interested candidates having right attitude and aptitude with RCI registration as professional in the relevant fields are invited to work under National Institute for the Mentally Handicapped.

Sl. No.	Name of the Post	No. of Posts	Scale of Pay	Age limit	Qualifications	Place of work
1.	Lecturer in Clinical Psychology (Reserved for OBC)	One	Rs.8000-275-13500	45 years	**Essential Qualifications :** a) M.A. in Psychology with two years Postgraduate Diploma (DM&SP) or M.Phil in Clinical Psychology of a recognised University. b) Two Years experience of working in Child Guidance Clinic or School for the children with Mental Retardation after Postgraduation Qualification **Desirable:** a) Candidates having experience of working in the field of vocational training and job placement will be given preference, b) Ph.D in Clinical Psychology.	Anywhere in India. Posting for the present is at NIMH RC, New Delhi
2.	Lecturer in Occupational Therapy (Reserved for ST)	One	Rs.8000-275-13500	45 years	**Essential:** 1. Master's in Occupational Therapy from a recognised University. 2. Two years experience in Occupational Therapy **Desirable:** Candidates having experience of working in the field of vocational training and job placement will be given preference.	Anywhere in India. Posting for the present is at NIMH, Secunderabad

3.	Special Education Teacher (Reserved for OBC)	One	Rs.5500-175-9000	35 years	**Essential:** 1. Graduate and Diploma in Special Education (M.R.) or Equivalent Or B.Ed. in Special Education (M.R.) Or B.R.S.(M.R.) with specialisation in Special Education 2. Five years experience of Working in a special school with Children with mental retardation	Model School for Mentally Deficient Children, New Delhi

Other requirements

1. The applicant must be a citizen of India.
2. The applicants in Government/ Semi-Government Organizations/Public Sector Undertakings/Autonomous bodies must send their applications THROUGH PROPER CHANNEL
3. Interested candidates should submit their applications on plain paper with detailed bio-data together with recent photograph and photocopies of all the certificates to the Assistant Administrative Officer(PA&M), NIMH, Manovikas Nagar, Secunderabad, 500 009.
4. The envelope containing the application should be superscribed "Application for the post of______________
5. **Last date for the receipt of applications is 15.02.2004.** Applications received late will not be considered.

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NATIONAL INSTITUTE OF RURAL DEVELOPMENT

(An Organisation of Ministry of Rural Development, Govt. of India)
Rajendranagar, Hyderabad 500 030

NIRD is the country's apex body for undertaking training, research, action research and consultancy functions in all aspects of rural development. Each year over 5000 participants from the States and neighbouring countries attend the Institute's programmes. Research, Action Research and field interventions on core issues of poverty and development are a unique feature of the NIRD. *Workshops, consultations and Seminars are also conducted to focus on important and current concerns of rural development.* The consultancy services of the Institute are made available to the Central and State Governments, national and International orgnisations. The Institute is a think-tank for policy formulation in the range of rural development interventions.

The Institute provides an inter-disciplinary academic environment, backed by an excellent infrastructure including a specialised library and state-of-art research and computer facilities. There are opportunities to interact with development practitioners, officials, NGOs, Academics and Researchers from India and overseas.

The Institute is poised for the extension of its activities, especially in the areas of action research in collaboration with leading national and international development organisations. The faculty is encouraged to innovate, excel and make a dynamic career. The Institute broadly follows the UGC Pay Scales.

ASSISTANT PROFESSORS: (17 Posts of which 9 are reserved for OBC, 1 for SC, 1 for ST and 1 for Physically Handicapped) in various disciplines. (Scale of pay Rs.8000-13,500) (UGC scale of Pay)

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Persons with atleast a high second class Post Graduate Degree in Social/Physical/Agricultural Sciences / Statistics / *Management and a Ph.D. may apply. Ph.D. is not essential for M.Tech. degree holders and for government officials*

Five years of teaching experience in a recognised University or training in an Institution or relevant field experience in any area relevant to Rural Development is essential. Independent research experience with publications of books and research papers required

Age: Below 35 years (Relaxable for SC, ST, OBC & Physically Handicapped candidates as per rules)

For details and downloading of application form, please visit http://nird.ap.nic.in or write to Registrar, NIRD along with a **Demand Draft for Rs.100/-** (for SC/ST candidates, copy of caste certificate will suffice).

Last Date for filled-in applications to reach Registrar, NIRD is **28-02-2004.**

Registrar & Director (Admn.)

NATIONAL INSTITUTE OF RURAL DEVELOPMENT

(An Organisation of Ministry of Rural Development, Govt. of India)
Rajendranagar, Hyderabad 500030

NIRD invites applications for the post of.

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(Scale of pay Rs.8000 - 13,500) (UGC scale of pay) on contract / deputation basis for a period of 3 years extendable to 5 years. Further tenure will be extended from time to time on the basis of performance.

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Master's degree in Physics / Mathematics / Statistics / Operational Research / Economics or Bachelor's degree in Engineering with Post Graduate Diploma in Computer Science and 4 years experience in Computer Software Development.

Age: *Below 35 years.(Relaxable for S.C.,S.T., OBC & Physically* Handicapped candidates as per rules)

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INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY

Powai, Mumbai 400 076.

Advt. No. M-46/03-04

Applications are invited from candidates with Ph.D., with consistently good academic record and with a minimum of 3 years teaching/research/professional experience for the position of "**Assistant Professor**" in its various academic Departments. The scale of pay is Rs.12000-420-18300 plus allowances. For further details visit our website **www.iitb.ac.in** and look under 'Recruitments' for the application form or look in *Employment News dated* **31.01.2004**. *In* case of difficulties, please contact **webmaster@iitb.ac.in.**

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How to apply: Application material can be obtained in person or by writing to the Admissions Office, IGIDR, Gen. A.K. Vaidya Marg, Goregaon (East), Mumbai 400 065 **(E-mail:** soffice@igidr.ac.in) on payment of **Rs. 100/- (non-refundable) in cash or by demand draft drawn in favour of Indira Gandhi Institute of Development Research payable at Mumbai**. Payment in any other form will not be accepted. The request for the application form in plain paper, along with the candidate's name, date of birth, sex, address, academic qualifications, choice of test centre and the application fee, must reach IGIDR by **April 09,2004.** The last date for receiving the completed application form is **April 16, 2004.**

Internet download: Interested candidates can also download the application material directly from **www.igidr.ac.in** and return the completed form along with the application fee by **April 16, 2004.**

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राष्ट्रीय औषधीय शिक्षा एवं अनुसंधान संस्थान

NATIONAL INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH (NIPER)

सैक्टर-67, एस.ए.एस. नगर (मोहाली), पंजाब - 160062

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Recruitment (Advt.No.02/2004)

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2.	Technical Assistant	1	1	1	4	7**	5000-150-8000/-	35
3.	Junior Technical Assistant	2	1	2	2	7**	3050-75-3950-80-4590	35

** One post each for Scientist Gr.II/RA,TA & JTA has been earmarked for physically handicapped (orthopaedically).

QUALIFICATION & EXPERIENCE

SERIAL NO. 1(E.Q): M.Sc. with 3 year research experience or M.Pharma with 2 years research/teaching. **DESIRABLE: (Post-1)** M.V.Sc.(Pathology)/Ph.D *with experience in Laboratory Animal Histopathology, experience in Regulatory Toxicology* **(Post-2)** M.V.Sc./Ph.D. in pharmacology with Experience in in-vitro/in-vivo animal protocols, molecular biological techniques. **(Post-3)** Ph.D. in synthetic organic/medicinal chemistry & experience in carbohydrate chemistry. **(Post-4)** M.Tech. (Computer Science-software development)/MCA with PG diploma in bioinformatics/chemoinformatics (with B.Sc. life sciences/chemistry at post graduate level) with 2 years in computer programming in biological area and biological database building.

* A candidate considered for appointment as RA may be promoted to Scientist Grade-II depending upon his performance after successful completion of 2 years as RA.

SERIAL NO.2 EQ: B.Sc. with 3 years research experience/teaching laboratory or M.Sc. **DESIRABLE (Post 1 & 2)** : M.Sc. (Life Sciences)/M.Pharm. with experience in modern biological techniques. **(Post-3)** : B.Pharm. with experience in manufacturing/development/quality control of pharmaceutical dosage form preferably in pharmaceutical industry. **(Post 5-6)** : B.Pharm with experience in dosage form and analysis of drugs.

SERIAL NO.3 E.Q : ITI Certificate/Inter-Science with two years experience in a research laboratory. Candidates should be able to perform day to day laboratory work.

DESIRABLE: B.Pharm. with experience in manufacturing/development/quality control of pharmaceutical dosage form preferably in pharmaceutical industry.

GENERAL: The competent authority may relax the conditions of academic qualification or age in case of suitably experienced candidates. Relaxation in age for SC/ST/PH/OBC candidates will be as per GOI. The positions are on contract basis for a period of five years which may be renewed depending upon the suitability of candidates. The number of posts may be increased/decreased depending upon the requirement at the time of interview. All the above positions carry usual allowances as per Central Govt. Rules. Higher Start can be considered for the candidates possessing exceptional merit. Candidates may also be considered for placement in respective lower grades depending upon qualification and experience. Mere fulfilling of minimum and desirable qualification does not entitle a candidate to be called for interview. Candidates already employed in Govt./Autonomous organisations must send their applications through proper channel. Canvassing in any form will be treated a disqualification for the post. Director, NIPER reserves the right to cancel the recruitment to any or all the above positions without assigning any reason.

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कुल सचिव

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